CONCISE HISTORY OF THE LANGUAGE SCIENCES

FROM THE SUMERIANS TO THE COGNITIVISTS

Edited by

E. F. K. KOERNER & R. E. ASHER

CONCISE HISTORY OF THE LANGUAGE SCIENCES

FROM THE SUMERIANS TO THE COGNITIVISTS

Leabharlann James Hardiman Ollscoil na hÉireann, Gaillimh
2806

CONCISE HISTORY OF THE LANGUAGE SCIENCES

FROM THE SUMERIANS TO THE COGNITIVISTS

Edited by
E. F. K. KOERNER
University of Ottawa
and
R. E. ASHER
University of Edinburgh

PERGAMON

UK Elsevier Science Ltd, The Boulevard, Langford Lane,
Kidlington, Oxford OX5 1GB, UK

USA Elsevier Science Inc, 660 White Plains Road, Tarrytown, New
York 10591-5153, USA

JAPAN Elsevier Science Japan, Tsunashima Building Annex, 3-20-12
Yushima, Bunkyoku, Tokyo 113, Japan

Copyright © 1995 Elsevier Science Ltd

All rights reserved. No part of this publication may be reproduced, stored in any retrieval system or transmitted in any form or by any means: electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise, without permission in writing from the publishers.

Library of Congress Cataloging in Publication Data
Concise history of the language sciences: from the Sumerians to the cognitivists / edited by E.F.K. Koerner, R.E. Asher.
p. cm.
Based on articles, some of which have been rev. and updated or enl. for this publication, which originally appeared in the Encyclopedia of language and linguistics (1994); the chapter on the Hebrew grammatical tradition is new.
Includes bibliographical references and indexes.
Contents: General—Antiquity to Middle Ages: the Near East—Antiquity: the Far East—Antiquity: India—Antiquity: Europe—Middle Ages: Europe—Renaissance: Europe—17th and 18th century Europe—The main strands of 19th century linguistics—20th century linguistics—Special applications: phonetics and translation.
1. Language and languages—History. 2. Linguistics—History. I. Koerner, E. F. K. II. Asher, R. E. III. Encyclopedia of language and linguistics.
P121.C585 1995
410'.9—dc20 95-35131

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library.

ISBN 0-08-042580-1

∞™ The paper used in this publication meets the minimum requirements of the American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials, ANSI Z39.48–1984.

Printed and bound in Great Britain by Cambridge University Press, Cambridge, UK.

Contents

Editors' Foreword xi

Section I: General

History of Linguistics : The Field 3
E. F. K. Koerner

Historiography of Linguistics 7
E. F. K. Koerner

Section II: Antiquity to Middle Ages — the Near East

Babylonian Grammatical Texts 19
Gene B. Gragg

Hebrew Linguistic Tradition 21
David Téné

Arabic Linguistic Tradition 28
Yasir Suleiman

Section III: Antiquity — the Far East

Chinese Linguistic Tradition 41
William S. -Y. Wang and R. E. Asher

Linguistic Thought in Japan 45
Stefan Kaiser

History of East Asian Phonetics 51
Edwin G. Pulleyblank

Section IV: Antiquity — India

Pāṇinian Linguistics 59
Paul Kiparsky

Indian Theories of Meaning 66
Frits Staal

Ancient Indian Phonetics 72
Madhav M. Deshpande

Tamil Linguistic Tradition 77
Kamil V. Zvelebil

Section V: Antiquity — Europe

Classical Linguistics: An Overview 83
Daniel J. Taylor

Plato and His Predecessors 90
Fred W. Householder

Aristotle and the Stoics on Language 93
Fred W. Householder

Dionysius Thrax, the *Technai*, and Sextus Empiricus 99
Fred W. Householder

Varro and Early Latin Language Science 103
Daniel J. Taylor

Roman Language Science in the Early Empire 107
Daniel J. Taylor

Apollonius Dyscolus and Herodian 111
Fred W. Householder

Roman *Ars Grammatica*, including Priscian 115
Even Hovdhaugen

Section VI: Middle Ages — Europe

Early Medieval Grammar 121
ANNELI LUHTALA

Linguistics in the Later Middle Ages 130
GEOFFREY L. BURSILL-HALL

Medieval Language Philosophy 137
DOMINIK PERLER

Section VII: Renaissance — Europe

Renaissance Linguistics: An Overview 147
W. KEITH PERCIVAL

Renaissance Linguistics in Italy 152
BRIAN RICHARDSON

Renaissance Linguistics in Spain 157
JUAN C. ZAMORA

Renaissance Linguistics in France 161
DOUGLAS A. KIBBEE

Section VIII: 17th and 18th Century Europe

Port-Royal Tradition of General Grammar 169
GARON WHEELER

Universal Language Schemes and Seventeenth-Century Britain 174
JOSEPH L. SUBBIONDO

Early Historical and Comparative Studies in Scandinavia, the Low Countries, and German-speaking Lands 179
KURT R. JANKOWSKY

Beginnings of Comparative and Historical Studies in Britain 183
MICHAEL K. C. MACMAHON

Origin of Language Debate in the Eighteenth Century 184
PAUL B. SALMON

Discovery of Sanskrit by Europeans 188
Rosane Rocher

Section IX: The Main Strands of 19th Century Linguistics

History of Comparative Linguistics 195
N. E. Collinge

History of Historical Linguistics 203
N. E. Collinge

History of Typology and Language Classification 212
E. F. K. Koerner

Section X: 20th Century Linguistics

Trends in Twentieth-Century Linguistics: An Overview 221
John E. Joseph

Saussurean Tradition in Linguistics 233
John E. Joseph

Geneva School, after Saussure 239
René Amacker

Neolinguistic School in Italy 243
Jörn Albrecht

Prague School Phonology 247
J. M. Y. Simpson

Prague School Syntax and Semantics 253
Eva Hajičová

The Glossematic School of Linguistics 262
Erik C. Fudge

Firth and the London School of Linguistics 268
F. R. Palmer

Systemic Theory 272
M. A. K. Halliday

Guillaumean Linguistics 277
John Hewson

Valency Grammar 280
David J. Allerton

Functional Grammar 290
André Martinet

American Structuralism 295
John G. Fought

Post-Bloomfieldian Phonology 306
Erik C. Fudge

Tagmemics 314
Linda K. Jones

Stratificational Grammar 320
David C. Bennett

Evolution of Transformational Grammar 326
Stephen J. Harlow

Generative Semantics 343
James D. McCawley

Applicational Grammar 348
Jim Miller

Case Grammar 352
John M. Anderson

Cognitive Grammar 364
Ronald W. Langacker

Section XI: Special Applications — Phonetics and Translation

Phonetics: Precursors to Modern Approaches 371
J. A. Kemp

History of Phonetic Transcription 388
J. A. Kemp

Early Modern Instrumental Phonetics 401
HANS GÜNTER TILLMANN

Speech Technology: Historical Antecedents 416
JOHN J. OHALA

History of Translation 419
LOUIS G. KELLY

Machine Translation: A Brief History 431
W. JOHN HUTCHINS

Machine Translation in North America 445
WINFIELD SCOTT BENNETT

Section XII: Indexes

Subject Index 453

Index of Biographical Names 483

List of Contributors 495

Editors' Foreword

There has in the later decades of the 20th century been an increasing awareness in the field of theoretical linguistics of the value in modern work of an appreciation of the views, findings, and insights of our predecessors through the ages. This book aims to present within the compass of a single volume a comprehensive history of the language sciences. Hitherto, works in this field have tended to concentrate on major periods of the history of Western linguistics. In our *Concise History of the Language Sciences* (henceforward *CHoLS*) an effort has been made to go beyond the traditional Eurocentric accounts which include the work of Indian grammarians only in the context of the discovery of the Indo-European language family by European scholars in the late eighteenth century, or which at times include a small chapter of classical Arabic linguistics as an alibi rather than because a dedicated effort is made to break through the Western (claim to) hegemony. Breaking with this tradition should need no justification. A proper understanding of mankind's reflections on the nature of language involves an awareness of the fact that there has been sophisticated discussion of the subject in all the great civilizations of antiquity. Moreover, whatever the geographical origin of linguistic theories developed in the twentieth century that have attracted international attention — and it would be going against the facts to deny that this is almost exclusively Europe and North America — it is the case that a number of these theories have benefited from insights developed in distant parts of the world in ancient times. Of these the best known example is probably Leonard Bloomfield, who stated in a number of his publications that he was making use of concepts and techniques that were to be found in Panini's work on Sanskrit produced some two and a half millennia ago, but he is by no means an isolated figure in this respect. Because a reasonably full account of all the linguistic treatises composed outside Europe in ancient times would fill a whole volume on its own, it has nevertheless been necessary to impose some restrictions on coverage, and the concentration has been on those traditions that one might claim have the greatest international relevance. Otherwise space would have been needed for, among others, the early Tibetan grammarians, the Korean, Burmese and Old Javanese linguistic traditions and early works in several of the regional languages of India, including those in three major Dravidian languages in addition to Tamil.

With the range of topics that have been covered, *CHoLS* is intended to complement recent, multi-volume histories of linguistics, two of them still in progress, beginning with *Geschichte der Sprachtheorie* edited by Peter Schmitter of Münster since 1987 (Tübingen: Gunter Narr), of which the first two volumes have been published, one dealing with issues of methodology of linguistic historiography, the other with Western antiquity. Another series of volumes, under the editorship of Sylvain Auroux of Paris, *Histoire des idées linguistiques* has also brought out two volumes thus far (Brussels: Mardaga, 1989, 1992), with a third and concluding volume scheduled to appear in the course of 1995. Like Schmitter's and Auroux's volumes, those edited since 1990 by Giulio C. Lepschy of Reading, *Storia della linguistica* (Bolgona: II Mulino), whose third and last volume appeared late in 1994, comprise chapters devoted to major periods of the history of (almost exclusively) Western linguistics written by acknowledged specialists in these areas.

The geographical spread in *CHoLS* is much narrower for more recent periods than that for distant ages, particularly with regard to the early nineteenth century onward. This is because of the important changes in the history of linguistics that occurred from that period through the development of comparative and historical linguistics in Central Europe, and the subsequent spread of these new approaches into most regions of the world may be taken to justify the stronger focus on Western linguistics in the latter half of *CHoLS*. The shift towards synchronic linguistics at the beginning of the twentieth century, as the 'Saussurean revolution' began to unfold, adds to the justification for this choice. In the twentieth century linguistics has come to mean 'Western linguistics' for better or worse. It should at the same time not be forgotten that many distinguished contributions to this modern linguistic scene have been made by scholars from all the continents. In this sense, perhaps, what we are seeing is a new 'world linguistics'.

Because of such considerations, we have seen fit to include an entire section on various trends, schools, and theoretical frameworks developed in Europe, North America and Australasia over the past 70 or so years. Here, again, considerations of space have necessitated that a selection be made. Choice has concentrated on those approaches in linguistic theory which can be expected to have some direct relevance to work being done at the beginning of the twenty-first century or those of which a knowledge is needed for a full understanding of the history of the linguistic sciences through the last half of the present century. In the final section of the book, there is coverage of some of the areas in which the findings of the linguistic sciences have been applied in important and significant ways.

This book is based on articles which originally appeared in *The Encyclopedia of Language and Linguistics* (published in 10 volumes in 1994 by Pergamon Press, Oxford), for which E. F. K. Koerner was subject editor for the History of Linguistics and R. E. Asher, Editor-in-Chief. One chapter, on the Hebrew Grammatical Tradition, is entirely new, and thanks are due to Professor David Téné of the Hebrew University, Jerusalem, for taking up the challenge of writing it. All the already existing articles have been revised and updated where necessary, and some have been significantly modified and enlarged, notably W. John Hutchins' "Machine Translation: A Brief History", Stefan Kaiser's "Linguistic Thought in Japan", J. M. Y. Simpson's "Prague School Phonology", and Kamil V. Zvelebil's "Tamil Linguistic Tradition". In the case of the articles contributed to the *Encyclopedia* by the late Fred W. Householder, Professor Daniel Taylor of Lawrence University kindly agreed to undertake whatever modifications he felt were called for. We are grateful to him as well as all other contributors for their cooperation and their ready support of the present project.

Finally, the editors of *CHoLS* would like, on the one hand, to acknowledge the generous support received over the years from the Social Sciences and Humanities Research Council of Canada in Ottawa and to express gratitude to The University of Hong Kong and Professor John E. Joseph, Head of its Department of English, for having provided the kind of environment that makes one pull all one's intellectual strengths together; and on the other to express appreciation to The University of Edinburgh and to the International Christian University, Tokyo, for providing pleasant and stimulating environments for writing and research during the preparation of this volume.

E. F. K. K.
Hong Kong

March 1995

R. E. A.
Tokyo

SECTION I

General

SECTION I
General

History of Linguistics: The Field

E. F. K. Koerner

A discipline comes of age when it seriously contemplates its own past. The 'History of Linguistics' (HoL)—frequently also referred to as 'History of the Language Sciences'—is an attempt to steer away from a narrow view of 'linguistic science.' HoL as a *bona fide* subject of academic research (in which doctoral dissertations can be written, for instance) began to develop only during the late 1960s, though such work had previously been done in departments of Germanic, Romance, or Slavic where such research surveys were at times undertaken to delineate the course a particular field had taken or the evolution of a specific idea or research project. It has been customary at least since the 1880s to add an historical introduction to textbooks in linguistics, but usually the intent has been to show the significance of recent advances in the field compared with previous endeavors. During the 1960s, following various claims made by Noam Chomsky that his own theories had little to do with the pursuits of his immediate predecessors and contemporaries, but instead follow quite different traditions such as those of the Port Royal Grammar (see *Port-Royal Tradition of General Grammar*) and of Wilhelm von Humboldt, the bulk of the dissertations written in HoL were devoted to just these areas of interest, at times seriously distorting the true intent and purpose of these earlier authors. Only from the 1970s onwards, following the creation of the first journal for this particular field of interest in 1973, *Historiographia Linguistica*, and the associated monograph series united under the umbrella title 'Amsterdam Studies in the Theory and History of Linguistic Science,' did serious work begin to emerge that challenged this *pro-domo* type of history-writing. These and other organized activities (on which further information is given below) led to the much more recent field of study, now generally referred to as 'Historiography of Linguistics' (see the next article) or 'Linguistic Historiography' for short, an approach to HoL which is conscious of methodological and epistemological requirements in adequate history-writing in linguistics as in any science. (Most of the contributions to the two-volume *Historiography of Linguistics* published in 1975 under the main editorship of Thomas A. Sebeok were little else but surveys of previous scholarship; 'historiography' there being used in the old sense of the term; the volume edited by Parret in 1976 followed largely the Chomskyan manner of misappropriating the history of linguistics for 'political' purposes.)

It is true that one would perhaps by now speak of a 200-year tradition of linguistic history writing, perhaps beginning with François Thurot's (1768–1832) 1796 *Tableau des progrès de la science grammaticale* (cf. Andresen 1978), though several earlier works have been cited, for instance, Elias Caspar Reichard's (1714–91) *Versuch einer Historie der deutschen Sprachkunst* of 1747 (cf. Koerner 1978a: vi, for references to other eighteenth-century works). However, as the record suggests, it is only from the late 1860s onwards that a more thorough type of treatment of HoL emerges, of which Theodor Benfey's (1809–81) *Geschichte der Sprachwissenschaft* of 1869 may be regarded as the most outstanding example. It had been preceded by Heymann Steinthal's (1823–99) work of 1863, which sought to supersede Laurenz Lersch's (1811–49) three-volume *Die Sprachphilosophie der Alten* (1838–41), but which dealt only with the contributions of Greece and Rome to linguistic thought. Benfey's history of linguistics was followed by other influential works such as Raumer (1870), Delbrück (1882[1880]), and Bursian (1883), which, however, were more limited in scope. The same could be said of books such as Thomsen (1902; German translation, 1927), Delbrück (1904), Trabalza (1908), Jellinek (1913), Pedersen (1916; English translation, 1983), Pedersen (1924; English translation, 1931), Drăganu (1945; Italian translation, 1970), or Robins (1951) from the first half of the twentieth century (for detailed descriptions of these books, see Koerner 1978a).

New endeavors and, at times, more insightful studies in HoL appeared in the 1960s, perhaps beginning with Paul Diderichsen's (1905–64) work on his compatriot Rask of 1960 (German translation, 1976). It was followed by works such as Ivić (1963; English translation, 1965), Leroy (1963; English translation 1967), Tagliavini (1963), Malmberg (1964), Lepschy (1966; English translation, 1970), Mounin (1967), Robins (1967), Coseriu (1969, 1972), Helbig (1970), Szemerényi (1971), Jankowsky (1972), and others (see Koerner 1978a for a full list). Yet most of them relied uncritically on earlier accounts and rarely ventured into questions of historiographical method or touched upon matters concerning the philosophy of science, except perhaps for a fashionable nod to Kuhn's *Structure of Scientific Revolutions* of 1962.

Looking back on the history-writing of linguistics since the 1880s, it is possible to discern three distinct types, each associated with particular motives for engaging in such activity and each occurring at specific periods in the development of the discipline. A fourth type (argued for in, e.g., Koerner 1976) has begun developing only since the late twentieth century (see the subsequent article for details).

First, there is the type of history written at a time when a particular generation or an individual representing the ideas, beliefs and commitments of his or her generation to a significant extent is convinced that a desired goal has been reached and that subsequent work in the field will mainly be concerned with what T. S. Kuhn has referred to as 'mopping-up operations.' These accounts assumed that the theoretical framework had been sufficiently mapped out for the ordinary member of the scientific community to conduct his or her investigations and that there was no longer any need for a revision of the methodology or the approach to the subject matter under analysis; they were summing-up histories which viewed the evolution of the field as growing in a more or less unilinear fashion.

This idea of, or motive for, writing such a history seems to be best expressed in Benfey's voluminous *Geschichte der Sprachwissenschaft und orientalischen Philologie* (1869), appearing one year after Schleicher's untimely death, but also by Raumer's *Geschichte der germanischen Philologie* (1870). It is difficult in the 1990s to recreate the atmosphere of the late 1860s even if one limits oneself to linguistic matters abstracting from external, e.g., sociopolitical, currents: histories available in the late twentieth century supply one with little, if any, information on this pre-neogrammarian period. Suffice it to recall for the present purpose that the works of Bopp, Rask, Grimm, and others had been significantly synthesized and methodologically developed by the generation of Georg Curtius (1820–85) and, especially, August Schleicher (1821–68), to the extent that one might speak of a 'paradigm' change having taken place at that time, of which the neogrammarian tenets of historical linguistic research associated with the names of their former students, notably Karl Brugmann (1849–1919) and August Leskien (1840–1916) were the logical, if somewhat overstated, outcome.

A similar observation about the motives of history-writing, it would seem, could be made about Holger Pedersen's (1867–1953) 1924 history of the achievements of nineteenth-century Indo-Europeanists, which was preceded by a similar and somewhat shorter account of his first published in 1916, the year of the completion of the second edition of Brugmann and Delbrück's *Grundriss* as well as the appearance of Saussure's *Cours*. The feeling of the need of such a summing-up history is expressed more clearly, perhaps, in Wilhelm Streitberg's (1865–1925) voluminous undertaking, entitled *Geschichte der indogermanischen Sprachwissenschaft seit ihrer Begründung durch Franz Bopp*. However, this is in fact more of a résumé of the work accomplished in the various branches of Indo-European philology by that time than a regular HoL (cf. Koerner 1978a: 16–17, for details). Begun in 1916, the enterprise was abandoned after 1936.

After World War II, it appears that the histories by Malmberg (1964), Ivić (1965), Leroy (1963), and others fulfilled a similar function of summing up previous attainments in linguistic science. This time the focus of attention was the post-1916 period in the history of linguistics, following the success story of Saussure's *Cours*, with its perceived emphasis on a non-historical approach to language. The neogrammarian framework of linguistic research was propounded in the histories of Pedersen, the organizational efforts of Streitberg from 1916 onwards, and other less influential books—and one may add that Pedersen, a second-generation neogrammarian, reflects the alleged 'data-orientation' of that school much more emphatically than the original group of scholars (note that neither Delbrück's *Einleitung* nor Paul's *Prinzipien* are even mentioned in his 300-page study of 1924). Only in the second half of the twentieth century (Jankowsky 1972, Einhauser 1990) have the neogrammarians received a more adequate treatment. By the same token, the histories of Malmberg, Ivić, Leroy, and other similarly slanted studies of the 1960s put forward particular post-Saussurean trends as the most significant achievements of the discipline to date, whether Copenhagen-type, Praguean, or Bloomfieldian. Their endeavor, like that of Benfey, Raumer, Pedersen, Streitberg, and others from an earlier stage in the development of linguistics, was to a large extent the presentation of a framework of research in which they themselves had been brought up, and, concomitantly, an attempt to maintain the strength and impact of the structuralist mode of thought.

The second type of history-writing activity may be characterized by the intention on the part of an individual usually in his thirties (not late forties or above, as is generally the case with the first type), again representing a particular group, to launch a campaign opposing previously cherished views and still prevailing doctrines. Thus in contrast to Benfey (1869), for example, Berthold Delbrück's (1842–1922) 1880 *Einleitung* served, together with Paul's *Prinzipien* of the same year, as the mouthpiece of a new generation of scholars eager to demonstrate that their achievements significantly surpassed previous attainments in the field, and that their theories rightfully replaced those taught by the preceding generation of linguists. The claim in favor of discontinuity is what characterizes this type of activity, and Delbrück's book is a prime example of this endeavor. Typically, Schleicher was depicted by Delbrück as representing the conclusion of the phase of comparative-historical grammar inaugurated by Franz Bopp in 1816, and the *Junggrammatiker*, with whom he associated himself early in his career (soon after he had received Schleicher's chair at the University of Jena in 1873), as marking a decisive new turn in the field.

No comparable history of linguistics was written in the 1930s or 1940s with regard to structuralism, but a look into Bloomfield's *Language* (1933) or Gray's *Foundations of Language* (1939) clearly suggests that the chapters devoted to HoL were an attempt to redress the development of the discipline and to document the superiority of the structuralist approach to any other theory or method hitherto put forward. This endeavor to prove earlier views to be utterly insufficient and inadequate has by no means been abandoned by adherents of the prevailing modes of linguistic thinking. On the contrary, it can easily be shown that their advocates have been eager not only to revive an interest in the history of linguistics itself but also to rewrite it to an extent that the ideas of the generation immediately preceding the present one appear the least worthy of attention. As a matter of fact, what C. F. Voegelin felicitously termed the 'eclipsing stance' that transformational-generative grammar had embarked on was best illustrated by Noam Chomsky himself, for instance in his 1962 lecture at the Ninth International Congress of Linguists held in Cambridge, Mass. (Chomsky 1964). Soon thereafter, a number of his followers ardently engaged themselves in writing their particular view of history; compare the articles by Dingwall (1963), Bach (1965), or Bierwisch (1966). In 1980, Frederick Newmeyer published a book which constitutes the best example to date of this *pro-domo*, whiggish type of history-writing. It selects and reinterprets past linguistic research in an attempt to prove his view that linguistics was made a science only in 1955 or in 1957, and by Chomsky, and that previous work was totally inadequate, barring a few minor incidental insights foreshadowing the 'revolution' in the field (cf. Koerner 1983, for a critical assessment of this kind of activity). Newmeyer's *Linguistics in America* (1980) appeared exactly 100 years after Delbrück's *Einleitung*, and the parallels between their authors are striking indeed: both were less than 40 when they wrote their books; both were primarily interested in syntax, not phonology, and neither had done his doctorate at the respective centers of the schools whose success story they depicted.

While Type I history-writing may appear more benign as it seems to represent matter-of-fact accounts (though one should not be too sure about this), Type II HoL can best be described as propagandistic in nature; the most successful example of this type is Chomsky's 1966 *Cartesian Linguistics*. This book presents the author's views regarding the ancestry of his own theories so brilliantly that many a young student of language was carried away by this new vision of history. Still today, one may discover a considerable amount of useful information in the histories written for the purpose of summing up previous work in the field, viz. the accounts by Benfey, Raumer, Pedersen, and others—although one may have become quite aware of their biases and shortcomings (for an assessment of these works, see Hoenigswald 1986 and Koerner 1990), whereas histories of the second category are already dated. It appears that, once their propagandistic purpose has been satisfied in proselytizing for the new ideology, the remainder rapidly loses its initial interest and apparent informational worth.

There is a third type of HoL which is intended neither to advocate a particular framework or 'paradigm' nor to attempt to provide an argument in favor of a scientific revolution within the discipline. This type may occur at any time in the development of a particular field of research since its ultimate intent is less partisan than in the other two instances and often more holistic in attitude, though the motivation behind the work may be fairly personal. The best example appears to be Arens's 1955 *Sprachwissenschaft*, in which an attempt was made to delineate the development of Western linguistic thought from the early discussions of the Greeks about the nature of language to contemporary linguistic work, certainly with a view to indicating not only that the discipline has come a long way to gain those insights which are now cherished and the methods that have been developed, but also that they have been built, knowingly or not, on the findings of previous generations of linguists, and that much more is owed to these scholars than one might ever become fully aware of.

While this Type III manner of presenting the HoL might well have been the result of a very personal choice, it appears that it expressed the endeavor of a whole generation of scholars, namely, the rebuilding of a discipline after its almost total destruction through a world war. Taken in this way, Pedersen's 1924 book may well be included in the third category in that it sought to re-establish a linguistic tradition which in his belief could continue to serve as a sound basis for subsequent work in the field.

Undoubtedly, other, often non-linguistic, motives played a role in presenting the history of the discipline in one way or another. Thus it should be recalled that particular socioeconomic conditions, historical events, or political situations have often had a considerable influence on the motivation of writing the history of a particular discipline or the acceptance of a seemingly new theoretical framework of research or mode of thought—and in this respect histories of linguistics have failed to increase our awareness of the impact of matters or events outside the field. The works of Benfey and Raumer, for instance, were highly motivated by the rise of German nationalism and the aspiration to national unity if not superiority. Similarly, Malkiel (1969: 557) rightly observed that the success of Saussure's *Cours* 'cannot be properly measured without some allowance for the feelings of that time: The acceptance of the leadership of a French-Swiss genius connoted for many Westerners then opposed to Germany a strongly desired, rationalized escape from the world of Brugmann, Leskien, Osthoff, and Paul.'

Despite the respect scholars may have for works of the third type, in particular Arens's *Problemgeschichte*, some have felt a need for yet a fourth type of history-writing (e.g., Koerner 1976[1972]; Simone 1975[1973]), namely, the presentation of the linguistic past as an integral part of the discipline itself and, at the same time, as an activity founded on well-defined principles which can rival, in terms of soundness of method and rigor of application, those of linguistics itself. This fourth type, now usually referred to as 'linguistic historiography' or, more properly, the 'historiography of linguistics' holds that the history of linguistics should not merely be subservient to the discipline, but ought to assume a function comparable to that of the history of science for the natural scientist. In short, while recognizing the important distinction between chronicle and history which Benedetto Croce is credited with, contributors to HoL in the early 1970s, have gone a step further by distinguishing between history and historiography. This is partly an attempt to make clear a departure from previous endeavors in the field, which only too often tended to be partisan-histories, if not what Henry Butterfield termed 'Whig-histories' (see also *Historiography of Linguistics*, sect. 1.2), and partly because previous histories did not provide a usable guide for the adequate treatment of past developments in the history of the language sciences, and thus failed to provide a better understanding of where the theories of the late twentieth century may lead us to.

Another indication of the History of Linguistics having become a mature field of scholarly endeavor is its professionalization. In 1978 the first International Conference on the History of the Language Sciences (ICHoLS) was held in Ottawa, Canada, the same year in which the *Société d'Histoire et d'Epistémologie des Sciences du Langage* (S.H.E.S.L.) was founded in Paris. In 1984, the Henry Sweet Society for the History of Linguistic Ideas (HSS) was established in Oxford, and several similar international and regional societies have been launched since; for instance, the North American Association for the History of the Language Sciences (NAAHoLS) which was launched late in 1987. In the meantime further ICHoLS meetings have been held in 1981 (Lille, France), 1984 (Princeton, NJ), 1987 (Trier, Germany), 1990 (Galway, Ireland), and 1993 (Washington, DC). In addition to *Historiographia Linguistica*, a second journal with similar goals, entitled *Histoire-Epistémologie-Langage*, was established in Paris in 1979, and in 1991, a third journal, *Beiträge zur Geschichte der Sprachwissenschaft*, was launched in Münster, Germany. In short, if the professionalization of the subject is any guide, the History of Linguistics has become a widely recognized and practiced field of scholarly research.

Bibliography

Andresen J T 1978 François Thurot and the first history of grammar. *Historiographia Linguistica* **5**: 45–57

Arens H 1955 *Sprachwissenschaft: Der Gang ihrer Entwicklung von der Antike bis zur Gegenwart*. Karl Alber, Freiburg (2nd enl. edn. 1969)

Bach E 1965 Structural linguistics and the philosophy of science. *Diogenes* **51**: 111–28

Benfey T 1869 *Geschichte der Sprachwissenschaft und orientalischen Philologie in Deutschland seit dem Anfange des 19 Jahrhunderts, mit einem Rückblick auf die früheren Zeiten*. J G Cotta, Munich

Bierwisch M 1966 Strukturalismus: Geschichte, Probleme und Methoden. *Kursbuch* **5**: 77–152 (Transl. *Modern Linguistics: Its development, methods and problems*. Mouton, The Hague)

Chomsky N 1964 [1962] *Current Issues in Linguistic Theory*. Mouton, The Hague

Chomsky N 1966 *Cartesian Linguistics: A Chapter in the History of Rationalist Thought*. Harper & Row, New York

Delbrück B 1880 *Einleitung in das Sprachstudium: Ein Beitrag zur Methodik der vergleichenden Sprachforschung*. Breitkopf & Härtel, Leipzig (2nd edn. 1884; 3rd edn. 1893)

Delbrück B 1882 *Introduction to the Study of Language: A Critical Survey of the History and Methods of Comparative Philology of Indo-European Languages*. Breitkopf & Härtel, Leipzig (Transl. by Channing E. New edn. with a foreword by Koerner E F K 1974 Benjamins, Amsterdam)

Dingwall W O 1963 Transformational Grammar: Form and theory: A contribution to the history of linguistics. *Lingua* **12**: 233–75

Einhauser E 1990 *Die Junggrammatiker: Ein Problem für die Sprachwissenschaftsgeschichtsschreibung*. WVT Wissenschaft- licher Verlag, Trier

Hoenigswald H M 1986 Nineteenth-century linguistics on itself. In: Bynon T, Palmer F R (eds.) *Studies in the History of Western Linguistics*. Cambridge University Press, Cambridge

Ivić M 1965 [1959] *Trends in Linguistics*. Mouton, The Hague (Transl. by Heppell M)

Jankowsky K R 1972 *The Neogrammarians: A Re-evaluation of Their Place in the Development of Linguistic Science*. Mouton, The Hague

Koerner E F K 1976 [1972] Towards a historiography of linguistics: 19th and 20th century paradigms. In: Parret H (ed.) 1976

Koerner E F K 1978a *Western Histories of Linguistic Thought: An Annotated Chronological Bibliography 1822–1976*. Benjamins, Amsterdam

Koerner E F K 1978b *Toward a Historiography of Linguistics: Selected Essays*. Benjamins, Amsterdam (Foreword by Robins R H)

Koerner E F K 1983 The Chomskyan 'Revolution' and its historiography: A few critical remarks. *Language & Communication* **3**: 147–69 (Extended version in Koerner E F K 1989)

Koerner E F K 1989 *Practicing Linguistic Historiography: Selected Essays*. Benjamins, Amsterdam

Koerner E F K 1990 On 'Unrewriting the History of Linguistics.' In: Bahner W, et al. (eds.) *Proceedings of the Fourteenth International Congress of Linguists (Berlin 1987)*, vol. 3, 2649–56. Akademie-Verlag, Berlin

Kuhn T S 1962 *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago, Illinois

Leroy M 1963 *Les grands courants de la linguistique moderne*. University Presses of Brussels, Brussels

Malkiel Y 1969 History and histories of linguistics. *Romance Philology* **22**: 530–66

Malmberg B 1964 [1959] *New Trends in Linguistics: An Orientation*. Naturmetodens Språkinstitut, Stockholm

Malmberg B 1990 *Histoire de la linguistique: Sumer à Saussure*. University Presses of France, Paris

Newmeyer F J 1980 *Linguistics in America: The First Quarter-century of Transformational-generative Grammar*. Academic Press, New York

Parret H (ed.) 1976 *History of Linguistic Thought and Contemporary Linguistics*. De Gruyter, Berlin

Paul H 1880 *Prinzipien der Sprachgeschichte*. Max Niemeyer, Halle (5th edn. 1920)

Pedersen H 1931 [1924] *Linguistic Science in the Nineteenth Century*. Harvard University Press, Cambridge, Massachusetts

Pedersen H 1983 [1916] *A Glance at the History of Linguistics, with Particular Regard to the Historical Study of Phonology*. Benjamins, Amsterdam

Raumer R von 1870 *Geschichte der germanischen Philologie*. J G Cotta, Munich

Robins R H 1967 *A Short History of Linguistics*. Longmans, London (3rd edn. 1990)

Sebeok T A (ed.) 1975 *Current Issues in Linguistics*. vol. 13: *Historiography of Linguistics*, 2 vols. Mouton, The Hague

Simone R 1975 [1973] Théorie et histoire de la linguistique. *Historiographia Linguistica* **2**: 353–78

Streitberg W (ed.) 1916–36 *Geschichte der indogermanischen Sprachwissenschaft seit ihrer Begründung durch Franz Bopp*, 6 vols. K J Trübner, Strasbourg; later on de Gruyter, Berlin

---

Historiography of Linguistics

E. F. K. Koerner

Historiography of Linguistics in the sense of 'principled manner of writing the history of the study of language,' and not in the (perhaps more traditional) sense of '(merely) recording the history of linguistic research,' is of recent vintage. It is to be kept distinct from 'History of Linguistics' (HoL) or 'History of the Language Sciences.' Thus, 'Historiography of Linguistics' is more than a term describing the activity of history-writing although it is of course concerned with this activity. 'History of Linguistics,' the field of study concerned with delineating the development of the science of language from its early beginnings to present-day commitments in the field, has, it appears, come into its own in recent years. The establishment of scholarly societies devoted to the history of linguistics, both in Europe and North America, is just one such sign, to which should be added the various specialized international meetings which have taken place since the late 1970s, notably the triennial International Conferences on the History of the Sciences of Language (ICHoLS): Ottawa, Canada (1978), Lille, France (1981), Princeton, U.S.A (1984), Trier, Germany (1987), Galway, Ireland (1990), Washington, D.C. (1993), and Oxford, England (1996). Other indications of the subject's approaching maturity are that a number of scholars have begun to take a serious interest in questions of method and epistemology of linguistic historiography, which had its first organized discussion in the late 1960s, when Thomas S. Kuhn's *The Structure of Scientific Revolutions* (1962) began to make its impact on the history of linguistics (Hymes 1974). Individual book-length efforts (Koerner 1978; Grotsch 1982; Schmitter 1982) were followed by colloquia and collective volumes devoted to the subject (Dutz & Kaczmarek 1985; Schmitter 1987; Hüllen 1990; Dominicy 1991), and one should like to see that the debate continues, as one cannot yet say that a viable manner of procedure, and a canon of historiographic research in linguistics that is widely accepted by the scholarly community, has been established to any satisfactory degree. In the meantime, it is quite legitimate for linguistic historiographers to look outside their own field for guidelines and models to imitate. It is important to realize, however, that the historians of linguistics because of the particular nature of the subject of investigation, namely theories of language (as well as theories of linguistics) and their evolution through time, must find their own framework, their methodology and epistemology, and cannot expect to be able to apply methods and insights from other fields directly to their own subject of investigation, as may become clear below.

To R. G. Collingwood and others (e.g., Croce) is owed the important distinction between chronicle and history. It is important to go a step further and distinguish between history and historiography. Few historical treatments of linguistics written up to the late twentieth century have outlined, not to say anything of having developed, a usable guide according to which the researcher in the field should and could operate without repeating the shortcomings, errors, and serious distortions of previous accounts. For the establishment of a historiography of linguistic thought, it must be stated that it is by no means sufficient to be well versed in matters linguistic in order to qualify as a historian of the discipline. As a matter of fact, until today the history of linguistics has suffered considerably from amateur work performed by distinguished students of language who turned their interest to this particular aspect of the discipline. Malkiel (1969: 532) spoke about the 'dual expertise' with which the historian of a given science must be equipped, namely, in addition to 'the specific knowledge of a scientific [...] domain,' she or he 'ought to know a good deal about the intellectual history (embedded within the matrix of general history).' The historiographer of linguistics, however, needs more than this dual expertise which must be regarded as the *conditio sine qua non* for anyone engaging in the research of past events in the development of linguistics.

Undoubtedly, the setting up of the very bases of a historiography of linguistics, a field of inquiry whose biases should be only in favor of re-establishing the most important facts of our linguistic past *sine ira et studio* and explaining, as much as possible, the reasons for the changes of direction and emphasis, and for possible discontinuity that can be observed, places high demands on individual scholarship, breadth of scope, and depth of learning, requiring an almost encyclopedic knowledge on the part of the investigator, given the almost interdisciplinary nature of this activity. Furthermore, it demands a capacity for synthesis, a faculty for distilling the essentials from the mass of empirical facts that may be gleaned from the primary sources. In other words, to use a contemporary distinction, the historiography of linguistics has to be 'theory-oriented,' not 'data-oriented,' though no doubt much reading of the original sources still will have to be done in order to establish adequately the basic facts in the development of the discipline. This has not been done to any satisfactory extent even for that century, the nineteenth, on which modern Western linguistics has built, whether speaking of the Neogrammarians and their work or those linguistic trends which followed Humboldtian ideas of language and mind, a tradition which has hardly been recognized in its full scope in present-day histories of linguistics. In effect, much of the job of presenting the history of linguistics in a scientific manner still needs to be done, the many efforts, individual or collective (e.g., Schmitter 1987; Auroux 1989–95; Lepschy 1993–95) notwithstanding.

Already during the early 1970s several scholars interested in the history of linguistics as an academic speciality endeavored to propose guidelines for the proper conduct of historiographic research (e.g., Hymes 1974; Simone 1975; Koerner 1976). At the time Kuhn's book (1962) had a considerable impact on the debate, resulting in much of the discussion centering on the question of to what extent Kuhn's morphology of scientific revolutions could provide a useful guide to the historian of linguistics. This discussion appears to have subsided during the later 1970s, possibly as a result of Percival's (1976) paper which argued against the search for 'paradigms' in linguistics without, however, offering any alternative route. There are of course a number of reasons why Kuhn had been so enthusiastically embraced by various social and behavioral scientists, although Kuhn's book was meant for the natural sciences, in particular theoretical physics. They include lack of acquaintance with the work of other, earlier and contemporary, philosophers of science and historians, lack of precision in many of Kuhn's definitions (allowing for differing interpretations of his argument), and his emphasis on the social dynamics involved in such changes, which appealed especially to social scientists. In other words, it may have been in part because of the open-endedness of Kuhn's book that it itself became paradigmatic. (Another reason for the success of Kuhn's book among the social sciences seems to be due to the fact that Kuhn had derived a number of ingredients of his work, including the concept of 'paradigm,' from the intellectual disciplines.)

The 1980s saw a variety of studies offering alternative lines of historiographic conduct, entering the debate over the proper approach to the history of linguistics (e.g., Bahner 1981; Bokadorova 1986; Christmann 1987). However, until the early 1990s no common ground has been established as to how to proceed in linguistic historiography and indications are that the debate will continue for some time (e.g., Elffers-van Ketel 1991, Part I). As a result, some of the positions and proposals that have been made by various authors outside linguistics and its history are analyzed before a variety of considerations are offered within which research in the history of the language sciences should be undertaken and past developments in the field presented.

1. Approaches to Linguistic Historiography

The search for the proper foundation of the historiography of linguistics has led to a number of differing proposals. These may have had their source in the particular area of study chosen by the researcher—no doubt it would make a difference whether one is studying the linguistic writings of the Middle Ages or the nineteenth century—as well as in the researcher's *Erkenntnisinteresse* ('research focus'). Those who enter the history of linguistics from the study of literature will, one may expect, offer different perspectives than someone coming from philosophy, history, or linguistics proper, not to mention those who enter linguistics from mathematics or the 'hard' sciences. The position advocated here is that a historian of linguistics should have linguistic training in order to have an adequate understanding of what the issues in this particular field are. Of course this is not enough. Too often late twentieth century linguists tend to project their interests and understanding of the subject back on past theories and, as a consequence, are apt to distort the issues and theoretical commitments of previous periods. Therefore the historiographer of linguistics has to familiarize himself or herself with more than the delineation of transmission of linguistic theory and practice and their changes through time.

1.1 History of Linguistics and Intellectual History

It appears that many scholars consider the History of Linguistics to be part of an overall History of Ideas. This impression may also be drawn from the fact that the Henry Sweet Society of Oxford, launched in 1984, carries 'for the history of linguistic ideas' as part of its name. It is a truism that the history of linguistics cannot be studied in a vacuum, simply as a succession of theories about language divorced from the general intellectual climate in which they were formulated. But the context must be still much wider and include an awareness of what other, neighboring as well as distant, disciplines were like at a given point in time. In short, too close an alignment of the History of Linguistics with the History of Ideas or a similar field of study does not appear to be a solution to the problem of finding the proper methodology for historiographical research in linguistics. For instance it appears revealing that as late as 1977, some forty years after the publication of Arthur O. Lovejoy's (1873–1962) influential book *The Great Chain of Being* (1936), a paper was published in the *Journal of the History of Ideas*, founded by Lovejoy in 1940, whose author asserts:

> On the whole, the methodology of the history of ideas is in its infancy. The field is in this respect behind general history, of which it is a part. One may therefore suggest that the interest of historians of ideas should be more directed towards the methodological problems of their field than has hitherto been the case. The reason is that when the foundation of a house is shaky, it does not make much sense continuously to add new stories to it.
> (Kvastad 1977: 174)

Unfortunately, Kvastad's own proposals are far from satisfactory; the pseudo-formal apparatus and the 'logical' definitions which he offers do not seem to lead, at least in his paper, to any new insight or useful principles of research. But a discussion regarding the points of contact—and the epistemological differences—between the History of Linguistics and the History of Ideas, whether in the sense of Lovejoy (1936) or in the sense of 'intellectual history' (Mandelbaum 1965) need not be abandoned for good. Indeed, some may argue that certain work such as Dominick LaCapra's *Rethinking Intellectual History* (1983) and much of his other writings could lead the historian of linguistics to new insights. However, if the exchange between one of his reviewers (Pagden 1988) and LaCapra (1988) is any guide, it appears that this line of work has progressed little beyond the discussion stage, and where it appears to be exemplified—at least in the case of LaCapra (see p. 680 and n. 3)—it produced analyses of literary or philosophical works, not intellectual history. As LaCapra himself concedes (1988: 678) his style is 'often polemical,' his objective being 'to lay the groundwork for a more fruitful inter-change among intellectual, cultural, and social history' and to defend 'intellectual history against misguided attacks' (p. 679). In short, it appears that the focus is still on epistemological and 'attitudinal' problems rather than methodological ones, so that one may wonder how much a historian can learn from these projects which are infiltrated by post-structuralist French thought, notably the work of Jacques Derrida, and which pretend to enter into 'dialogical discourse' with 'past voices' without realizing 'that to converse with the past one must first attempt to reconstruct it—text or author' (Pagden 1988: 526). Interestingly enough, while attacking the work of those that follow the French *histoire des mentalités* program which, because of their emphasis on a given 'mind set' said to determine a given culture, has to resort to unspecified external pressures if they want to account for change, the work of LaCapra and others seems to lead to presentist accounts rather than to historical analysis.

The nature of linguistics as a field with a well-defined object—human language in all its manifestations—requires more than an association with or an inspiration from the History of Ideas—or the 'History of Philosophy,' for that matter. Passmore (1967) expresses himself against the idea, championed by Kristeller (1964), that historians rather than philosophers write the history of philosophical ideas, arguing that the 'pure historian with no philosophical enthusiasm is almost certain to compose a doxography' (1967: 229), i.e., an entirely detached chronological and biographical account of past philosophical schools of thought. In this Passmore is in full agreement with the view expressed by Malkiel (1969), cited earlier.

In Koerner 1978, Carl Lotus Becker's (1873–1945) concept of 'climate of opinion' was particularly useful in mapping out the intellectual atmosphere of a given period in which certain ideas flourished, were received, or rejected. Becker (1932: 5) exemplified his term in the following manner:

> Whether arguments command assent or not depends less upon the logic that conveys them than upon the climate of opinion in which they are sustained. What renders Dante's argument or St Thomas's definition meaningless to us is not bad logic or want of intelligence, but the medieval climate of opinion—those instinctively held conceptions, in the broad sense, that *Weltanschauung* or world pattern—which imposed on Dante and St Thomas a peculiar use of the intelligence and a special type of logic. To understand why we cannot easily follow Dante or St Thomas it is necessary to understand (as well as may be) the nature of this climate of opinion.

Those working in the history of linguistics will surely have learned to appreciate Becker's observation, though they will also have learned that not only the intellectual climate of a given period will have to be reconstructed but also a number of other factors that may have played a role in fostering certain views or theoretical positions. That is, if one is to obtain a better understanding of the general intellectual context in which particular theories are developed, then a broadly defined history of ideas may prove of use, but not a panacea.

1.2 History of Linguistics and the Philosophy, Theory and Practice of History

As suggested by Malkiel, general historical research and the discussions guiding it may have something to offer historians of linguistics. In this field of study the work of Hayden White has been referred to frequently in the late twentieth century—albeit not by linguistic historiographers as far as can be seen—as influential in the debate of proper historical method. In his book *Metahistory* White was celebrating the work of four nineteenth-century historians—Jules Michelet, Leopold von Ranke, Alexis de Tocqueville, Jacob Burckhardt—as representing 'not only original achievements in the writing of history but also alternative models of what a "realistic" historiography might be' (1973: 141). At the same time, White (p. 433) argued that 'we are free to conceive "history" as we please, just as we are free to make of it what we will,' thus suggesting, it would seem, that there are no criteria available to define the subject. In a collection of papers published five years later, he is found taking a 'linguistic turn' similar to LaCapra and others. Here he claims that 'the conventional distinctions between "history" and "historism" are virtually worthless' (White 1978: 101); instead, he 'seeks to show that in the very *language* that the historian uses to describe his object of study, [...] he subjects that object of study to the kind of distinction that historians impose upon their materials in a more explicit and formal way' (p. 102).

In other words, White is not much interested in actually writing history but in analyzing and criticizing the 'discourses' of other historians or theorists of history, notably Michel Foucault—hence his predilection for 'metahistory.' In his collection of essays, subtitled 'Narrative discourse and historical representation,' White characterizes Foucault's discourse as '"positively" wide (if seemingly capricious) erudition [presented as] solemn disclosures of the "way things really were" aggressive redrawings of the map of cultural history, confident restructurings of the chronicle of "knowledge"' (1987: 107). He does not venture into a discussion of how Foucault's (1926–84) *Les mots et les choses*, for instance, might have contributed to the discussion of early nineteenth-century historical-comparative philology as constituting a new 'épistèmé' in the history of linguistics.

Again, observations by 'traditional' historians at times more enlightening than the theoretical 'discourses' of modern theorists with literary aspirations have been found. For example, in discussing twentieth-century developments in linguistics and the manner they are presented, Herbert Butterfield's (1900–79) description of the 'Whig interpretation of history' is particularly apt:

> Through this system of immediate reference to the present-day, historical personages can easily be classed into the men who furthered progress and the men who tried to hinder it; so that a handy rule of thumb exists by which the historian can select and reject, and can make his points of emphasis.
>
> (Butterfield 1931: 11)

While some may think that 'Whig history' and/or 'presentism' are modern phenomena, they are found as long as history has been written. Again from a methodological point of view there does not seem to be much guidance from regular historians or philosophers or theorists of historical analysis available to the linguistic historiographer, in part because the subject of inquiry, theories about language as well as linguistics itself, is epistemologically quite distinct from historical events, their description, interpretation, and explanation.

1.3 Linguistic Historiography and History and Philosophy of Science

In contrast to intellectual history and the various approaches to the treatment of general history—though linguistic historiography has to take into proper account intellectual currents of a given period which may have impacted on linguistic thinking—the History and Philosophy of Science appears to have more to offer to the historian of linguistics, in part because of its advances in epistemology and methodology. Evidently, Kuhn's (1962) morphology of scientific revolutions played an important part in the discussion (cf. Lakatos & Musgrave 1970). However, it seems widely agreed that the nature of (the conduct of) science and of the philosophy of science, whether it be in terms of the more recent paradigmatism (cf. also Laudan 1977) or traditional inductivism and its opposing philosophy of science, refutationism (Popper 1959, 1962), make their proposals interesting to the historian of linguistics. Of particular interest are proposals made by scholars such as Foucault (1970); Hesse (1963, 1980); Kuhn (1977); Lakatos (1974, 1978); Pandit (1983); Sneed (1971), and others (e.g., Krige 1980).

As an example of how observations made by historians of science could offer historians of linguistics fruit for thought, the following quotation is given. This statement was made some fifteen years ago by the British historian of science Martin Rudwick who—referring to Hesse (1963)—noted the following about the desirability of investigating what he terms 'creative analogies' in the development of a field of research, especially in its formative stage:

> It is at least arguable that major cognitive innovation is most likely to emerge in the scientific work of individuals who choose to employ analogies that [. . .] are strongly 'external': that is, analogies that are furthest removed from the 'normal practice' of the discipline concerned. This may happen when a scientific field scarcely yet deserves the name of 'discipline,' because its practice is not yet strongly insulated and institutionalized.
>
> (Rudwick 1979: 67)

Rudwick was writing about Charles Lyell's role in the development of geology as a science but his observation could well have characterized the situation that the early comparative-historical linguists at the beginning of the nineteenth century were facing. The 'displacement of concepts' is to be reckoned with each time a scholar or scientist is concerned with developing something of a 'research program' (Lakatos 1978). How else could s/he express him/herself in a new mode without resorting to analogies, metaphor, and borrowing from other fields of knowledge?

There are of course many other instances where the historian of linguistics can profit from reading historians and philosophers of science. Indeed, especially for nineteenth- and twentieth-century linguistics many of their findings could offer useful concepts and tools for research and actual history-writing. As said earlier, Kuhn's *The Structure of Scientific Revolutions* has been singularly influential, not only in linguistics but also in anthropology and sociology. In programmatic statements made during the 1970s Kuhn's ideas are frequently referred to but nowhere is an uncritical application of his proposals to the history of linguistics suggested. Yet concepts such as 'paradigm' or, following Kuhn's own suggestion of 1970, 'disciplinary matrix,' 'normal science,' and 'scientific revolution' may still prove 'useful to the historian of linguistics if he does not press the argument to a point where it no longer makes sense' (Koerner 1989: 50). Needless to say, the same would apply, *mutatis mutandis*, to concepts and notions found in the works of other historians and philosophers of science, be it those in the line of Popper's refutationism or any other framework, for example, Mario Bunge's epistemological approach (1984).

1.4 Linguistic Historiography and Sociology of Science

Several years ago Roger Chartier complained about 'the almost tyrannical preeminence of the social dimension' in historical studies (quoted by Pagden 1988: 520). It seems therefore inescapable that the historian of linguistics should take note of work in the sociology of science (e.g., Merton 1973; Mullins 1973; Amsterdamska 1987; Murray 1994), possibly even of the findings of '*Wissenssoziologie*' (Stark 1991).

Again Kuhn's emphasis on the social nature of scientific revolutions played a role in the study of group formations in science—Kuhn spoke about the 'invisible college'—such as analyzed by Mullins (1973) for biology and, following him, Murray (1994) for anthropology and linguistics. However, Amsterdamska's (1987) account of one hundred years of linguistics from Bopp to Saussure from a point of view of Mertonian sociology of science, while not without merit, has brought out little which has not been known—and accounted for—by historians of nineteenth-century linguistics, such as the important role of the system of higher education in Prussia for the institutionalization of the field.

Yet it remains true that the success story of the *Junggrammatiker*—or the followers of Noam Chomsky for that matter—cannot simply be explained in terms of the victory of one particular, supposedly novel, linguistic approach over another, although it cannot be denied that the replacement of the 'Sanscrito-centric' view of the Indo-European *Ursprache* by one giving ancient Greek and Latin more attention in phonological reconstruction played an important role in the change from the position upheld by Schleicher during the 1860s to the framework advocated by Brugmann and his associates from 1876 onwards (cf. Mayrhofer 1983). In other words, while certain proposals within a discipline have had their intrinsic merits, their wider acceptance within the research community has been helped by external factors, such as the considerable expansion of post-secondary education after the Franco-Prussian war of 1870, as a similar drastic expansion of college education in the USA and also in Europe during the 1960s had a significant effect on the wide reception of the theories of Noam Chomsky during the period and the subsequent decades. But again it seems that there is no particular methodological framework to be gained for linguistic historiography from the sociological approaches to science, apart from retaining an awareness of extra-disciplinary factors which frequently have an effect on the evolution of a given discipline, whether seemingly exact or less rigorously defined.

1.5 Towards a Synthesis of Differing Approaches

The above excursions into other historical fields, general history, intellectual history, history and philosophy of science, and sociological approaches to history have all made us aware that the history of linguistics can learn something from all these disciplines or subdisciplines. However, none of them alone can serve the linguistic historiographer as a guide in research. In fact, in the final analysis, historians of linguistic science will have to develop their own framework, both methodological and philosophical. In this effort, a thorough acquaintance with historical theory and practice in other fields will prove very useful indeed, even if the result is negative, in that the historian of linguistics discovers that this or that another field of historical investigation has in fact little to offer in matters of historiographical method.

Thus it appears that the History of Ideas provides little insight to the linguistic historiographer that would not be come upon; it provides a general recognition that linguistic theories are not developed in total isolation from the general intellectual climate of a period or the particular attitudes maintained by the society fostering scientific activity. In a similar vein, it may be recognized that at least a smattering in the sociology of science and, perhaps more importantly, an understanding of the dynamics of social networks within any scientific organization would do the historian of linguistics some good (Murray 1994).

More promising results, may come from exposure to the discussions conducted among philosophers and historians of science. Kuhn's influential 1962 book has been invoked several times before, but the various reactions and counter-positions deserve comparable attention. The history of linguistics is not to be treated like a branch of the history of ideas, at least not with the advent of comparative-historical philology in the early nineteenth century. This is because linguistics, unlike philosophy, for example, is a science and that it has to do with (at times rather complex) theories, not merely general ideas about the nature of language. This assertion might require the historian of linguistics to enter into the debate about the scientific status of linguistics, at least where nineteenth- and twentieth-century linguistics is concerned. (For earlier periods of the study of language, preceding the scientific age ushered in by nineteenth-century natural science, other criteria may have to be developed; no doubt, the application of modern principles in the philosophy of science to these earlier periods is hazardous. Indeed, the understanding of what is 'scientific' and what constitutes 'science' may have to be redefined for different periods in the history of the discipline under investigation.)

The other, possibly complementary, avenues open to the historian of linguistics are to develop principles derived from historical practice. Thought is devoted to the development of particular models which may guide research, critical analysis of the work of predecessors, several of which have shaped much of the view of the past, and discussion of particular problems facing the researcher, such as the idea of 'influence,' the continuity/discontinuity debate or the question of 'metalanguage' in linguistic historiography, to cite just a few examples. In short, there is still much work to be done before the History of Linguistics will have become a Historiography of the Sciences of Language.

2. Developing Principles for Linguistic Historiography

The 1980s witnessed a lively debate on matters of historiographic methodology in the history of linguistics (see the papers brought together in Dutz & Kaczmarek 1985 and in Schmitter 1987); much of the earlier discussions—and controversies—has been surveyed by Ayres-Bennett (1987). Yet in the absence of accepted guidelines for the treatment of the history of linguistics (note however proposals made earlier by others, e.g., Simone 1975), an attempt should be made to develop principles of research and procedures of historiographical work in linguistics. In the meantime, concepts such as 'disciplinary matrix' and 'climate of opinion,' 'continuity' versus 'discontinuity,' 'evolution' versus 'revolution,' 'mainstream' versus 'undercurrent,' 'data-orientation' versus 'theory-orientation,' and others have become widely accepted terms even if there is not always unanimity with regard to their purport and the scope of their applicability.

There are a number of methodological—and epistemological—problems facing the linguistic historiographer. These include questions of periodization, contextualization, and research procedure generally as well as issues concerning shifts of emphasis in actual linguistic practice, the identification of different phases of development within a particular framework or wider periods of time, and the role of external, for instance socio-political, factors in the acceptance or rejection of particular theoretical frameworks. Their adequate discussion would require book-length treatment, so that the few selected topics presented below should simply be taken as examples of the complexity and range of the subjects the linguistic historiographer has to be *à cheval* with. At the same time, they may be taken to suggest that the principled treatment of the history of linguistics—linguistic historiography—is still far from having an established and widely practised frame of research conduct.

2.1 The Question of 'Metalanguage'

The use of present-day terminology in the depiction of earlier phases in the development of linguistic thought has led to a variety of problems in our understanding of past theories; Chomsky's *Cartesian Linguistics* (1966) is the best-known example of the distortion by a twentieth-century linguist of ideas about language held by seventeenth-, eighteenth- or nineteenth-century scholars. What the excitement of the 1960s and 1970s with Chomsky's interpretation had largely covered up became evident to every serious linguistic historiographer: that Chomsky's distortions were due to no small degree to the improper identification of terms and concepts of previous centuries with present-day definitions and concerns. It can easily be recognized that Chomsky's particular use of '(to) generate,' which has its source in mathematical work and translation theory of the 1950s, has little to do with Humboldt's idea of 'erzeugen,' which has its source in eighteenth-century psychology and philosophy of language. Unlike Chomsky, Humboldt did not view speech as the mechanical production of sentences by a high-powered machine (Chomsky's frequent disclaimers notwithstanding) but as the truly creative effort by the individual (in fact Humboldt had the artist and thinker in mind, not every-day small-talk). Considering the 150 or so years that separate Humboldt and Chomsky, this divergence of views is not at all unusual. But the linguistic historiographer must not only realize it but also account for it. Epistemological problems are no doubt involved here, but the most obvious point is the question of 'metalanguage,' that is the language employed to describe past ideas about language and linguistics.

When dealing with a given subject concerning the history of linguistics the writer cannot escape the issue when discussing theories of past periods, since an attempt is being made to render them accessible to present readers while at the same time trying not to distort their original intent and meaning. Unless the linguistic historiographer has nothing but an antiquarian goal, namely to describe concepts developed many years ago solely within their own terms, there will be a temptation to use modern technical vocabulary in their analysis. This 'modernizing' procedure, however, has led to a number of serious distortions in the history of linguistics, and any discerning historiographer must realize the pitfalls and address this potential problem of the use of 'metalanguage.'

There are many examples in modern historical accounts of the ideas of past centuries where the ideas, concepts, and procedures are misunderstood, misrepresented, and distorted because of a lack of care taken by the author in the use of 'metalanguage.' Only too frequently have Saussurean notions of the arbitrariness of the sign been used to discuss Stoic 'semiotics' (as if these Greek thinkers had read *Cours* and the papers of C. S. Peirce to boot). Likewise, the (anonymous) authors of twelfth- and thirteenth-century tracts on Icelandic orthographic reform have been seen in the light of structural phonology (as if they had had access to Trubetzkoy's *Grundzüge*), the pedagogical intents of the Port-Royal grammarians have been interpreted as early examples of a 'generative' approach to syntax (as if they had seen Chomsky's *Aspects*), to mention just a few illustrious examples (for further details, see Koerner 1995, ch. 2). The solution to the problem of the possible misuse of technical language by the linguistic historiographer may lie in the adoption of the following three principles, which admittedly go beyond the question of metalanguage:

(a) The first principle for the presentation of linguistic theories propounded in earlier (pre-twentieth-century) periods concerns the establishment of the general 'climate of opinion' of the period in question. Linguistic ideas have never developed independently of other intellectual currents of the time; what Goethe called the '*Geist der Zeiten*' has always left its imprint on linguistic thinking. At times, the influence of the socio-economic and even political situation must be taken into account as well. (Consider the 'natural order' discussion of syntactic organization in eighteenth-century France, a discussion in which French was shown to be superior to other languages, and the political supremacy aspirations of France of the same period.) This first guideline may be called the 'principle of contextualization.'

(b) The next step the linguistic historiographer should take consists of endeavoring to establish a full understanding, both historical and critical, possibly even philological, of the linguistic text in question. It goes without saying that it is necessary to make abstraction from the individual's linguistic background and present-day commitments in linguistics. The general framework of the theory under investigation as well as the terminology used in the text must be defined internally and not with reference to modern linguistic doctrine. This consideration may be called the 'principle of immanence.'

(c) Only after the first two principles have been followed so that a given linguistic pronouncement has been understood within its original historical context, may the historiographer venture to introduce modern approximations of the technical vocabulary and conceptual framework presented in the work in question. Maybe this last step could be termed the 'principle of adequation.' It is of course required that the historiographer must explain why and to what extent the late medieval concept of

> '*significatio vocis*,' for example, could be rendered as '*signifié*,' or to what extent the Saussurean distinction between 'synchrony' and 'diachrony' might be applied to earlier theoretical statements concerning the relationship between 'descriptive' and 'historical' approaches to language. As a rule, the linguistic historiographer must alert the reader to the fact that the terminological approximations have been introduced; in other words, it must be made explicit and precise about what is actually being done.

If, and only if, these three principles, namely, historical and intellectual contextualization, analysis of the text within its own framework (what German literary historians mean by 'immanente Interpretation'), and a clear identification of the tools employed in the attempt to make the text more easily accessible to the modern reader, are properly taken into account, is there a good chance that serious distortions of ideas and intentions of linguists, philosophers of language, or grammarians of the past are avoided.

By proposing these above principles for the linguistic historiographer to follow it is not intended to imply that there may not be other legitimate interests in past theories. For instance, one may have no argument with someone interested in studying the work of the *Modistae*, because they may have been the first to confer a theoretical status to grammar and because 'their speculative grammar seems to satisfy the modern request of explanatory adequacy,' at least as long as this is not presented as history. Indeed, it is a relief to be assured by the author that '[t]he necessary methodological reserve is not to identify the ancient definitions with modern ones but only to consider the significant affinity underlying both definitions' (Benedini 1988: 135).

2.2 The Argument of 'Influence'

Among the various other methodological issues of linguistic historiography, such as questions concerning innovation versus continuity, evolution versus revolution in the study of language (on which see Koerner 1989, chs. 6–8), the argument in terms of 'influence' is widely used, and often indiscriminately. Rarely is a distinction drawn between a kind of influence that may have to do with shared experiences, education, and the *Zeitgeist* in general, on the one hand, and direct influence that could be documented on the basis of explicit references, textual parallels, public acknowledgment, and the like. The pitfalls of the careless use of the argument from 'influence' can be illustrated with reference to considerable number of recent supposedly historical accounts. Perhaps all too frequently in modern linguistics proposals of phonological or syntactic analysis have to make claims of originality to be taken note of, leading detractors to point to antecedents, actual or hypothesized, in an attempt to invalidate such claims. This tendency has found its way into linguistic history-writing, though it is more natural to expect a historian to find more instances of evolution and continuity than of revolution and discontinuity of ideas with the passage of generations, centuries, and longer periods of time, punctuated by changes of emphasis, including pendulum swings, at times caused by the influx of extra-linguistic factors, such as advances in technology but also socio-political events.

Leaving aside the many *bona-fide* instances where an author directly refers to the work of others, critically or approvingly, and perhaps less obvious ones where such influences can be proved through textual (as well as contextual) analysis, there are still a large number of cases to be found in many accounts where claims are based on superficial similarities between authors, a misreading of the texts in question, or motivated by the attempt to reduce the importance of a major figure in the history of linguistic theory, as has happened frequently with the work of Humboldt and Saussure, both of whom are no doubt particularly original thinkers. Leaving aside Hans Aarsleff's (1982: 335–55) claims that Humboldt owed much more to Condillac and the *Idéologues* than to Kant and Herder, a position only few have found valid (cf. Koerner 1989: 33–35), there are at least two frequently reiterated claims of 'influence' that have persisted in the literature despite evidence to the contrary, namely, August Schleicher's so-called 'Darwinism' and Saussure's sociologism of the Durkheimian mould.

Schleicher is well-known for his argument that linguistics should be a part of the natural sciences; moreover, it was he who combined the early nineteenth-century strains of comparative, historical, and typological linguistics to form a new synthesis of language analysis and reconstruction, advancing both the methodology (based on the family tree idea) and the terminology (e.g., the use of asterisked forms). Both have antecedents in linguistics but Schleicher was the first to draw methodological principles from them. When he read a German translation of Darwin's *Origin of Species* in 1863 and noted in an essay of the same year that he saw his own ideas about language evolution confirmed by Darwin's findings, many subsequent writers, without reading what Schleicher had frequently stated before 1863 (and not realizing that he had published two Indo-European 'Stammbäume' as early as 1853 for instance, six years before the first appearance of *Origin of Species*), took this to mean that Schleicher was 'influenced' in his linguistic thinking by Darwin (cf. Koerner 1989: 35–37 and chs. 10, 11, 20, for details). Schleicher as a linguistic Darwinist is still a fixture in many textbooks, although this is demonstrably false.

Likewise, the claim that Saussure's understanding of language as a *fait social* has been taken as an indication that he had developed his concept of 'langue' under the influence of Emile Durkheim's (1858–1917) sociological principles, although to the present day no one has actually been able to provide convincing evidence for this dependency. However, the fact that they are close contemporaries, both writing in French, and express comparable ideas appears to have been suggestive enough for many to reiterate a suggestion first made at the Second International Congress of Linguists (Geneva 1931), although no lesser scholar than Antoine Meillet, Saussure's pupil during his Paris years and subsequent correspondent and friend during his Geneva period, strongly denied such a connection (see Proceedings of the Congress, p. 147). It should be added that Meillet, for his part, had collaborated with Durkheim from 1901 onwards. Scholars until the late twentieth century, however, have tended to perpetuate the myth despite the fact that Durkheim's name never appears in Saussure's writings, published and unpublished, whereas Saussure regularly refers to the work of Whitney whenever he speaks of language as a social institution. For a true historiographer of linguistic science such carelessness with the available evidence is unacceptable whenever such claims are propounded. Perhaps, as a general rule, heed should be taken of Roman Jakobson's famous adage 'What is commonly accepted as a fact is probably untrue.' (For details concerning Saussure's sociological sources, see Koerner 1989: 37–40).

3. Conclusion: Tasks for the Historiography of Linguistics

The preceding sections have illustrated the fact that much work is still required to establish a historiography of linguistics that would lead to the adoption of a generally accepted framework for conducting historical research dealing with the subject broadly described as linguistic study. At the same time, with the availability of by now three refereed journals devoted to the history of linguistics, *Historiographia Linguistica* (Amsterdam 1973/74–), *Histoire–Epistémologie–Langage* (Paris 1979–), and *Beiträge zur Geschichte der Sprachwissenschaft* (Münster, 1991–), and the annual meetings of the various regional and international societies following the foundation of the *Société d'Histoire et d'Epistémologie des Sciences du Langage* (SHESL) in 1978, the establishment of the Henry Sweet Society for the History of Linguistic Ideas (HSS) in Oxford in 1984, the North American Association for the History of the Language Sciences (NAAHoLS) late in 1987, and several other groupings in Europe since then, there is every reason to believe that the level of scholarship in the history of linguistics will continue to improve and that the various problems and principles of linguistic historiography will become part and parcel of the general awareness and research practice of the majority of participants in the enterprise.

Bibliography

A. History and Historiography of Linguistics

Aarsleff H 1982 *From Locke to Saussure: Essays on the Study of Language and Intellectual History*. University of Minnesota Press, Minneapolis, Minnesota

Auroux S (ed.) 1989, 1992, 1995 *Histoire des idées linguistiques*. 3 vols. Pierre Mardaga, Brussels

Ayres-Bennett W 1987 Linguistic Historiography. *Linguistics Abstracts* **3(3)**: 113–25

Bahner W 1981 Theoretische und methodologische Aspekte in der Historiographie der Sprachwissenschaft. *Deutsche Zeitschrift für Philosophie* **29(11)**: 1281–93

Benedini P 1988 La teoria sintattica dei Modisti: Attualità dei concetti di reggenza e dipendenza. *Lingua e Stile* **23**: 113–35

Bokadorova N Ju 1986 Problemy istoriologii nauki o jazyke. *Voprosy Jazykoznanija* **35(6)**: 68–75

Christmann H H 1987 Quelques remarques sur l'histoire de la linguistique. *Historiographia Linguistica* **14**: 335–41

Dominicy M (ed.) 1991 *Epistémologie de la linguistique*. (= *Histoire—Epistémologie—Langage*, **13(1)**). Presses Universitaires de Vincennes, Paris

Dutz K D, Kaczmarek L (eds.) 1985 *Rekonstruktion und Interpretation: Problemgeschichtliche Studien zur Sprachtheorie von Ockham bis Humboldt*. Gunter Narr, Tübingen

Elffers-van Ketel E 1991 *The Historiography of Grammatical Concepts*. Rodopi, Amsterdam

Grotsch K 1982 *Sprachwissenschaftsgeschichtsschreibung: Ein Beitrag zur Kritik und zur historischen und methodologischen Selbstvergewisserung der Disziplin*. Alfred Kümmerle, Göppingen

Hüllen W (ed.) 1990 *Understanding the History of Linguistics: Problems and Projects (Symposium at Essen, November 23–25, 1989)*. Nodus, Münster

Hymes D (ed.) 1974 *Studies in the History of Linguistics: Traditions and Paradigms*. Indiana University Press, Bloomington, Indiana

Hymes D 1974 Introduction. In: Hymes D (ed.) 1974, 1–38. (Revised version in Hymes D 1983 *Essays in the History of Linguistic Anthropology*. Benjamins, Amsterdam

Koerner E F K 1976 Towards a Historiography of Linguistics: 19th and 20th century paradigms. In: Parret H (ed.) *History of Linguistic Thought and Contemporary Linguistics*. De Gruyter, Berlin

Koerner E F K 1978 *Toward a Historiography of Linguistics: Selected Essays*. Benjamins, Amsterdam (Foreword by Robins R H)

Koerner E F K 1989 *Practicing Linguistic Historiography: Selected Essays*. Benjamins, Amsterdam

Koerner E F K 1995 *Professing Linguistic Historiography*. Benjamins, Amsterdam

Lepschy G C (ed.) 1993–95 *History of Linguistics*, 4 vols. Longman, London

Malkiel Y 1969 History and histories of linguistics. *Romance Philology* **22**: 530–66, 573–74

Mayrhofer M 1983 *Sanskrit und die Sprachen Alteuropas: Zwei Jahrhunderte des Widerspiels von Entdeckungen und Irrtümern*. Vandenhoeck & Ruprecht, Göttingen

Percival W K 1976 The applicability of Kuhn's Paradigms to the History of Linguistics. *Language* **52**: 285–94

Schmitter P 1982 *Untersuchungen zur Historiographie der Linguistik: Struktur—Methodik—theoretische Fundierung*. Gunter Narr, Tübingen

Schmitter P (ed.) 1987 *Geschichte der Sprachtheorie*. vol. I:

Zur Theorie und Methode der Geschichtsschreibung der Linguistik. Gunter Narr, Tübingen

Simone R 1975 Théorie et histoire de la linguistique. *Historiographia Linguistica* **2**: 353–78

B. History of Ideas

Becker C L 1932 *The Heavenly City of the Eighteenth Century Philosophers*. Yale University Press, New Haven, Connecticut (35th printing, 1971)

Kvastad N B 1977 Semantics in the methodology of the History of Ideas. *Journal of the History of Ideas* **38**: 157 74

LaCapra D 1983 *Rethinking Intellectual History: Texts, Contexts, Language*. Cornell University Press, Ithaca, New York

LaCapra D 1988 A review of a review. *Journal of the History of Ideas* **49**: 677–87 (A reply to Pagden A 1988)

Lovejoy A O 1936 *The Great Chain of Being: A Study in the History of an Idea*. Harvard University Press, Cambridge, MA. Repr. 1970 Harper & Row, New York

Mandelbaum M 1965 History of Ideas, Intellectual History, and History of Philosophy. *History and Theory*, Beiheft **5**: 33–66

Pagden A 1988 Rethinking the linguistic turn: Current anxieties in intellectual history. *Journal of the History of Ideas* **49**: 519–29

C. General History and History of Philosophy

Butterfield H 1931 *The Whig Interpretation of History*. G. Bell & Sons, London

Carr D W, et al. (eds.) 1982 *La philosophie de l'histoire et la pratique historique historienne d'aujourd'hui/Philosophy of History and Contemporary Historiography*. University of Ottawa Press, Ottawa

Foucault M 1970 *The Order of Things: An Archaeology of the Human Sciences*. Pantheon, New York

Kristeller P O 1964 History of Philosophy and History of Ideas. *Journal of the History of Philosophy* **2**: 1–14

Passmore J 1965 The idea of a History of Philosophy. *History and Theory*, Beiheft **5**: 1–32

Passmore J 1967 Philosophy, History of. In: Edwards P (ed.) *The Encyclopedia of Philosophy*, vol. VI: 226–30. Macmillan, New York

White H V 1973 *Metahistory: The Historical Imagination in Nineteenth-century Europe*. Johns Hopkins Press, Baltimore, Maryland

White H V 1978 *Tropics of Discourse: Essays in Cultural Criticism*. Johns Hopkins Press, Baltimore, Maryland

White H V 1987 *The Content of the Form: Narrative Discourse and Historical Representation*. Johns Hopkins Press, Baltimore, Maryland

D. History and Philosophy of Science

Bunge M 1984 Philosophical problems in linguistics. *Erkenntnis* **21**: 107–73

Hesse M B 1963 *Models and Analogies in Science*. Sheed & Ward, London (New edn. 1966 University of Notre Dame Press, Notre Dame, Indiana)

Hesse M B 1980 *Revolutions, and Reconstructions in the Philosophy of Science*. Indiana University Press, Bloomington, Indiana

Krige J 1980 *Science, Revolution, and Discontinuity*. Harvester Press, Brighton Humanities Press, Atlantic Heights, New Jersey

Kuhn T S 1962 *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago, IL (2nd enl. edn., 1970)

Kuhn T S 1977 *The Essential Tension: Selected Studies in Scientific Tradition and Change*. University of Chicago Press, Chicago, IL

Lakatos I 1974 *Proofs and Refutation: The Logic of Mathematical Discovery*. Worrall J, Zahar E (eds.) Cambridge University Press, Cambridge

Lakatos I 1978 *The Methodology of Scientific Research*. Cambridge University Press, Cambridge (Ed. by Warrall J, Currie G)

Lakatos I, Musgrave A (eds.) 1970 *Criticism and the Growth of Knowledge*. Cambridge University Press, Cambridge

Laudan L 1977 *Progress and Its Problems*. University of California Press, Berkeley, CA

Pandit G L 1983 *The Structure of Scientific Knowledge: A Study in the Methodology of Epistemic Appraisal*. Reidel, Dordrecht

Popper K R 1959 [1934] *Logic of Scientific Discovery*. Basic Books, New York

Popper K R 1962 *Conjectures and Refutations: The Growth of Scientific Knowledge*. Basic Books, New York

Rudwick M J S 1979 Transposed concepts from the human sciences in the early work of Charles Lyell. *Images of the Earth: Essays in the History of the Environmental Sciences. Papers from a conference on 'New Perspectives on the History of Geology,' Cambridge, April, 1977*: 67–83. British Society for the History of Science, Chalfont St Giles

Sneed J D 1971 *The Logical Structure of Mathematical Physics*. Reidel, Dordrecht

E. Sociology of Science

Amsterdamska O 1987 *Schools of Thought: The Development of Linguistics from Bopp to Saussure*. Reidel, Dordrecht

Merton R K 1973 *The Sociology of Science: Theoretical and Empirical Investigations*. University of Chicago Press, Chicago, IL (Ed. by Storer N W)

Mullins N C 1973 *Theories and Theory Groups in Contemporary American Sociology*. Harper & Row, New York

Mullins N C 1980 *Social Networks among Biological Scientists*. University of Chicago Press, Chicago, IL (Ed. by Zukerman H, Merton R)

Murray S O 1994 *Theory Groups and the Study of Language in North America: A Social History*. Benjamins, Amsterdam

Stark W 1991 *The Sociology of Knowledge: Toward a Deeper Understanding of the History of Ideas*. Transaction Publishers, New Brunswick, New Jersey

SECTION II

Antiquity to Middle Ages — the Near East

SECTION II

Antiquity to Middle Ages — the Near East

Babylonian Grammatical Texts

Gene B. Gragg

The rise of distinct grammatical traditions has not happened often in history, and an important task for the history of linguistics, and for the history of ideas in general, is to examine and compare the contexts in which this happened, the basic concepts which were developed, and the language representations which resulted. As far as is known, the phenomenon first occurred in Southern Mesopotamia (Babylonia), where a tradition of grammatical description is attested in texts from the early centuries of the second millennium BC, and continues to be elaborated until the end of the cuneiform writing tradition in Hellenistic times.

1. Cuneiform Scholarship: The List as Data/Discourse Structure

The earliest, and far and away most frequent, use of the cuneiform writing system (amounting to perhaps 90 percent of Sumerian tablets) was for administrative purposes. These administrative texts are in large part list-like documents containing inventories, ration lists, receipts, work rosters, etc., often, especially in the case of monthly and yearly summaries, containing complex columns of subtotals accounting for the intersections, for example, of categories of workers and categories of rations. The column organized by intersecting category and subcategory remains until the end a dominant format of Mesopotamian scholarly production.

Along with the first administrative texts comes evidence of the institution which developed and transmitted the writing system—the scribal school. Already the transformation of the writing system itself from a pure logographic system into a mixed logographic–syllabic system in the course of the third millennium is implicit evidence of a good deal of grammatical and phonological analysis. Moreover, among the earliest cuneiform tablets are texts generated for use in the scribal school itself. These texts are themselves list-like in character—in the first instance topically arranged lists of signs (signs for fish, signs for animals, signs for various classes of artifacts), tending already from the beginning toward exhaustive inventories of the nominal lexicon of Sumerian (or of the world represented by that lexicon). Over the centuries and millennia (the tradition lasts more than 2,500 years) these lists were standardized and redacted into canonical series, and provided with an Akkadian translation as knowledge of Sumerian became restricted to scribal circles. New lists were drawn up of signs with syllabic values; new bilingual lexical series were created; official compendia and epitomes were made of longer series. (The entire corpus of this lexicographic literature is being edited in the series *Materialien zum sumerischen Lexikon*, see Landsberger et al. 1956.) Beyond the lexical–philological domain, other areas of knowledge—astrology, divination, medicine were also systematized in list form and archived next to the lexical compendia.

Given this preoccupation with the systematization, codification, and translation of the Sumerian lexicon, it is not surprising to find emerging in this corpus a special genre of texts which gives Akkadian equivalents, not to isolated citation forms, but to a whole range of systematically varying forms of the same word (for the most part a pronoun, demonstrative, or, especially, a verb)—in other words parallel paradigms in these two morphologically rich, but typologically very different languages. As in all the other instances of list scholarship, no external scaffolding or supplementary text explains the principles and categories used in constructing the paradigms. But close examination of the longer texts reveals the systematic application of what can be at times a surprisingly complex hierarchy of categories, some of which correspond to a limited number of technical terms, attested for the most part in the latest period.

All of the texts of this genre, classified by the editors into OBGT 'Old Babylonian Grammatical Texts' and NBGT 'Neo-Babylonian Grammatical Texts,' which were known by the mid-1950s were edited by Landsberger et al. (1956) with an important introduction by Thorkild Jacobsen. Jacobsen (1974) gives a general introduction to the genre; Black (1984) updates the corpus, and offers an extensive reinterpretation. The available corpus comprises some forty texts. The most important subdivision is between texts which contain more or less extensive paradigms of whole words (about two-thirds of the texts, see Sect. 2), and texts which gloss grammatical constituents (see Sect. 3).

2. Grammar as Word-List

The simplest texts of the whole-word paradigm sort are the lists of pronominal and adverbial expressions, . of which the longest, OBGT I, must have originally had 1200 lines. The following excerpt from the plural section is typical (note the order of persons!):

457	*menden-eše*	*nīnu-mi*	they say 'we'
458	*menzen-eše*	*attunu-mi*	they say 'you'
459	*enene-eše*	*šunu-mi*	they say 'they'

(Sumerian quotative particle *-eše* = Akkadian *-mi*.)

A much more complicated task faced the compiler of parallel verb forms. In the first place, a much wider range of categories was involved in each of the languages, and the categories in one language often do not have an obvious counterpart in the other. Different detailed solutions were adopted for different verbs, although certain features of organization remain constant throughout the texts. The following is an outline of the solution adopted in the largest verbal paradigm, the 318-line OBGT VII, which deals with the verb: (Sumerian) *du*/*ŋen* = (Akkadian) *alāku* 'go' (where the Sumerian has a suppletive stem expressing an aspectual distinction, perhaps 'punctual' versus 'durative').

The highest category on the hierarchy is 'singular (oblique) complement' (in the first half of the paradigm) versus 'plural complement' (in the second half). The complement is represented by an indirect object pronominal suffix in Akkadian, and by the 'dimensional' prefix *-ši-* 'to, toward' in Sumerian—one of a class of prefixes formally related to the nominal case postpositions. Each of these two parts is divided into 'singular subject' versus 'plural subject,' which in turn are divided into 'modal' versus 'indicative.' The indicative (but not modal) forms are divided into 'present(-future)' versus 'preterit.' The modal forms are subdivided into 'ventive' versus 'nonventive,' each of which is subdivided into 'nonseparative' versus 'separative.' The same category subdivisions apply to the indicative, but in a different, partially chiastic order: first the forms are divided into 'nonseparative' versus 'separative,' then the nonseparative are divided into 'nonventive' and 'ventive' and the separative into 'ventive' and then 'nonventive.' The ventive (roughly, 'motion toward speaker') is represented by the *-am* suffix in Akkadian, and by *-m-* prefix forms in Sumerian; the separative by the *t-* infix derived stem in Akkadian and the *ba-* conjugation prefix or a derivative from it in Sumerian (as argued by Black 1984). The penultimate category is 'person of complement' (third person, or absence of complement, versus first or second person). The lowest-branching category, which thus distinguishes successive forms in a column, is person of subject. In the modal forms the order is: 'second person' (represented by the imperative), 'first person' (represented by the cohortative *ga-* prefix forms in Sumerian), 'third person' (represented by optative *hé-* prefix forms). In indicative forms the order is 'third person,' 'first person,' 'second person.'

Some idea of this text may be obtained from the following excerpts from the singular-subject, singular-complement section, starting with a three-line excerpt from the modal forms, and continuing with the indicative present, with and without complement, ventive, ventive-separative, separative-nonventive, and then some corresponding preterit forms (in the following, English glosses are chosen ad hoc merely to suggest the grammatical categories involved):

19	*ŋen-na*	*alik*	'go!'
20	*ga-ŋen*	*lullik*	'may I go!'
21	*hé-ŋen*	*lillik*	'may he go!'
40	*an-du*	*illak*	'he goes'
41	*an-du-un*	*allak*	'I go'
42	*an-du-un*	*tallak*	'you go'
43	*an-ši-du-un*	*illakšum*	'he goes to/for him'
46	*àm-du*	*illakam*	'he comes'
49	*àm-ši-du*	*illakaššum*	'he comes to/for him'
52	*àm-ma-du*	*ittallakam*	'he comes away'
55	*àm-ma-ši-du*	*ittallakaššum*	'he comes away to/for him'
62	*ba-du*	*ittallak*	'he goes away'
65	*ba-ši-du*	*ittallakšum*	'he goes away to/for him'
68	*in-ŋen*	*illik*	'he went'
74	*ì-im-ŋen*	*illikam*	'he came'
80	*im-ma-ŋen*	*ittalkam*	'he came away'
90	*ba-ŋen*	*ittalak*	'he went away'

Much as these paradigms reveal about the analyses of verbal forms made by the earliest grammarians, many questions remain unanswered. For one thing, although the tablets contain many verbal forms and categories, many other attested categories and combinations of categories are not contained in these texts, even for such an exhaustively treated verb as *du*/*ŋen* = *alāku*. How complete then was the analysis of the system supposed to be? Moreover, was the starting point of the paradigm an analysis of Akkadian (then provided with Sumerian equivalents), or vice versa, or were the systems analyzed jointly? Finally, the fact that some very rare, and possibly nonoccurring, forms get listed shows that the paradigms were not a simple practical compendium for looking up forms that a scribe needs to read or write, but were drawn up to demonstrate underlying principles of word-formation. But how adequate was the theory, what stage of Sumerian did the compilers understand, and how well did they understand it?

3. Grammar as Word-Constituent-List

A further step in grammatical description is represented by a series of texts containing long lists of elements, a few of which are independent pronouns or conjunctions, but most of which are affixal in nature and include verbal prefixes and suffixes of all classes (modal, 'conjugation,' dimensional, pronominal), nominal postpositions, pronominal possessive suffixes, and various simple and compound enclitics. The most complete compilations of this kind (NBGT I, 462 lines; NBGT II, 279 lines) come from the late period (a colophon dates it to the seventeenth year of the Persian King Darius), but entries of this kind occur in earlier texts, and it is possible that tradition of this kind of analytical annotation goes back to the period of the OBGT texts. Akkadian glosses, usually pronominal in nature, are less consistently given in the longer texts (less than half of the entries in NBGT I); a novum however is the use of an explicit technical grammatical terminology in some of the glosses (in about 35 lines in NBGT I and 55 in NBGT II). The following are the principal terms and their lexical base (see Black 1984 for discussion): 'prefix, infix, suffix' ('above, middle, below'); perhaps 'vowel-final, consonant-final' ('empty, full'); literally 'turned' (perhaps 'away from speaker'?, 'away from normal position'?); perhaps 'ventive' (etymology uncertain); perhaps 'separative' ('completed,' apparently not aspectual); 'singular, plural' ('one, many'); 'punctual, durative' ('fast, slow/fat').

Unlike the verbal paradigms, the principles underlying the organization of these texts are quite obscure. At the least these texts show that Babylonian scribal institutions possessed a format which could in principle provide a kind of description for the whole of Sumerian morphology. Whether such an explicit description was ever compiled, in the written or oral tradition, cannot be known for sure at this point. By referring to NBGT I and II as 'epitomes' Black (1984) suggests that they are extracts of some larger, more complete work—and in fact the colophon of NGBT I refers to it as a section of a longer tablet in a still longer series (neither now preserved). Further discoveries in Mesopotamian scholarship may yet reveal whether these or other longer works were in fact complete grammars.

Bibliography

Black J A 1984 *Sumerian Grammar in Babylonian Theory*. Biblical Institute Press, Rome

Jacobsen T 1974 Very ancient linguistics: Babylonian grammatical texts. In: Hymes D (ed.) *Studies in the History of Linguistics*. Indiana University Press, Bloomington, Indiana

Landsberger B, Hallock R, Jacobsen T, Falkenstein A 1956 *Materialien zum sumerischen Lexikon*, vol. IV. Biblical Institute Press, Rome

Hebrew Linguistic Tradition

David Téné

Biblical Hebrew (= BH) became an independent subject of investigation around 900 AD at the latest. It is commonly held that Saadya ben Joseph al-Fayyūmī (882–942), known as Saadya Gaon, is the first to have composed a Hebrew grammar and a Hebrew dictionary.

Until the middle of the sixteenth century, for more than 600 years the study of BH had been pursued almost exclusively by Jewish scholars for an almost exclusively Jewish audience. Therefore, early Hebrew linguistics should be considered as a branch of Jewish expository writing. In the sixteenth century, the situation gradually changed as Christian scholars made substantial attempts to write grammars for non-Jewish students of BH (e.g., Johann Reuchlin 1506; Sebastian Münster 1524). Thereafter, Hebrew linguistics became part of European linguistics and will not be dealt with here. Nor will this article cover Modern grammars of BH composed in Hebrew in the nineteenth and twentieth centuries, since these works, although they continue the early Hebrew linguistic tradition, in the main reflect modern scholarship.

1. A Late Beginning and a Quick Development

It is rather astonishing that Hebrew linguistics emerged so late, that until the beginning of the tenth century there had been no explicit attempts to produce a systematic grammatical and lexical description of BH. The answer to this may be sought in two reasons. (a) Until the end of the first millenium, Jews had expressed their encyclopedic knowledge in predisciplinary and nonterminological discourse in the

Midrash (lit. 'examination,' or 'investigation,' a particular genre of early Rabbinic literature (second century AD onwards) constituting a compilation of homilies, biblical exegesis and sermons delivered in public). Jews did not yet write treatises on mathematics and geometry, astronomy and medicine, nor did they write systematic grammars and dictionaries. (b) In semitic languages a word is structurally the point of intersection of a lexical root (a sequence of usually three consonants) and a grammatical pattern (a sequence of vowels with or without affixes). The intersection is by way of staggering. Semantically, roots signify the lexical, patterns the grammatical meaning of the word. In writing, letters represent consonants only. For centuries, the BH text was made of letters only. Hence, only consonants were represented graphically. Consequently, the grammatical meaning was not (and could not be) represented at all. It follows that before the introduction of the vowel signs, a grammatical description of BH was an impossible task. In the third quarter of the first millenium AD, generations of *Masoretes* (*Masora* being a branch of Rabbinical literature that dealt with the transmission of the BH text: the rules of its exact copying and correct recitation) both in Palestine and in Babylon made great efforts to provide the Hebrew biblical text with vowel signs. By the end of the ninth century, the *Masoretic* school of Ben Asher (a family of *Masoretes* that flourished in Tiberias for six generations from the second half of the eighth century) finally produced a copy of a fully vocalized BH including cantilation signs. This vocalized text became the officially received version of the BH text, and would later serve as a corpus for the description of BH (except for the Samaritan grammarians and lexicographers).

Despite its late and modest beginning, Hebrew Linguistics developed quickly and by 1050 it reached its culmination in the words of Yehuda Ḥayyūj, Yonah ben Janāḥ and Samuel ha-Nagid. Once the BH text had been fully and finally vocalized, Hebrew linguistics did not embark on the painstaking route of inventing a descriptive method. Instead, they borrowed it wholesale from the Arab Grammarians. As BH and Classical Arabic are cognate languages, these early grammarians only had to adapt the Arabic descriptive method to the specific features of BH and to the linguistic situation of the Arabic-speaking Jews.

The borrowing of the Arabic descriptive method is linked with the personality of Saadya Gaon (882–942; born in Pithon, Egypt, he lived in Tiberias and became head of the Rabbinical academy of Sura near Baghdād). He was the greatest Jewish scholar in the tenth century. A man deeply sensitive to the spiritual needs of his time, he ushered in a new epoch in almost every area of Jewish culture, integrating it into Arabic–Islamic civilization. He was a pioneer in philosophy; he systematized Talmudic law; he translated the Bible into Arabic; he wrote commentaries on many Biblical books, formulating new principles of interpretation modeled upon the rules of Greco–Arabic rhetoric. He was also the first to compose a Hebrew Grammar and he understood that as his contemporary co-religionists, scholars and students, studied Arabic Grammar as part of their education and formation, it would be appropriate to follow in the first grammar of BH the descriptive method of Arabic grammarians known in his time.

2. The Development of Hebrew Linguistics

The period 900–1550 should be considered as one well-defined and well-delimited unit in the history of the scientific study of BH. We know of altogether 91 authors who have composed 145 works. This unit can be divided into four major periods:

(a) The period of the first attempts which extends until the end of the tenth century: 10 authors—14 works.
(b) The creative ('classical') period which reaches the middle of the twelfth century: 23 authors—37 works.
(c) The period of popularization ending in the middle of the thirteenth century: 17 authors—30 works.
(d) The period of stagnation until the middle of the sixteenth century: 41 authors—64 works.

A chronological list of the authors and their works has been published in the *Encyclopedia Judaica*, Vol. 16 (1971), pp.1352–90, with a bibliography *ibidem*, pp.1400–01, and may be consulted there.

2.1 Period I: First Attempts (Tenth Century)

Except for the Grammar composed by Saadya Gaon, no other work composed in this period dealt with grammar, but instead were lexical works containing grammatical excurses. In the East and in North Africa, authors used Middle Arabic with Hebrew characters. In Spain, they wrote in Hebrew. David b. Abraham Alfāṣī (in Arabic, Abū Suleimān Dā'ud ibn Ibrāhīm al-Fāṣī) (mid-tenth century; born in Fez, Morocco, lived in Jerusalem) a *Ḳaraite* (member of a Jewish sect—founded in Babylonia between 754 and 775—that recognized the Scriptures as the sole and direct source of religious law to the exclusion of the Rabbinical oral tradition), composed in Jerusalem the first comprehensive Hebrew-Arabic lexicon of the Bible: *Kitāb Jāmiᶜ Al-Alfāẓ* ('Book of Words'). The second half of the century was dominated by a controversy surrounding a dictionary of the Bible composed in Hebrew in Cordoba around 960 by Menaḥem ben Saruḳ (mid-tenth century) titled *Maḥberet* ('Book [of Solutions]'). His opponent Dunash ben Labrat (mid-tenth century; born in Baghdād, lived in Fez and afterwards in Cordoba) raised 160 criticisms, most of them well-founded. Three of Menaḥem's pupils defended their master and wrote some 50 replies to the objections raised by Dunash and a pupil of the latter wrote

41 replies to the objections of Menaḥem's pupils. The controversy continued into the twelfth century outside the borders of Spain, in France, Provence and even reached England. Jacob b. Meir Tam (ca.1100–71; of Ramerupt, Champagne) in his *Sefer Ha-Hakhra'ot* ('Book of Decisions') defended Menaḥem and mostly decided in his favor. Joseph b. Isaak Ḳimḥi (ca.1105–ca.1170; born in Spain, died in Narbonne, Provence) wrote his *Sefer Ha-Galuy* in answer to Tam's 'Decisions' justifying the criticisms of Dunash. And finally, Benjamin of Cambridge (twelfth–thirteenth centuries) defended Tam's 'Decisions' against Ḳimḥi's criticisms. The scientific achievements of Period I are rather meagre.

2.2 Period II: The Creative ('Classical') Period (1000–1140)

In this period, all works were written in Arabic with Hebrew letters mostly in Spain. In the East authors of the first half of the eleventh century continued to produce works that do not differ theoretically or methodologically from that of Period I. Abū al-Faraj Harūn ibn al-Faraj (in Hebrew: Aaron b. Jeshua) (first half of eleventh century; lived in Jerusalem), wrote in Arabic three works, the most important being *Al-Kitāb Al-Mushtamil 'ala Al-Uṣūl Wa Al-Fuṣūl Fī Al-Lugha Al-Ibrāniyya* ('The Comprehensive Book on the Roots and Branches of the Hebrew Language'), a vast and prolix grammar of nearly 600 pages. Ḥay ben Sherira (939–1038; Pumbedita near Baghdād) composed in Arabic an anagrammatic dictionary of Biblical and Mishnaic Hebrew as well as Aramaic. It is a vast and rudimentary work probably planned as a means of memorizing Hebrew and Aramaic words, their Arabic translation and their immediate contexts.

Around 1000 AD, Yehudah b. David known as Ḥayyuj (Arabic, Abū Zakariyyā Yaḥyā Ibn Dāwud) (ca.945–ca.1000; born in Fez, lived in Cordoba) wrote inter alia his two works on the hollow and geminate verbs in BH: (a) *Kitāb Al-Af'āl Dhawāt Ḥurūf Al-Līn* ('The Book on Hollow Verbs'), an essay on the morphology of verbs which contain *'alef*, *waw* or *yod* as one of their radicals or *he* as third radical; (b) *Kitāb Al-Af'āl Dhawāt Al-Mithlayn* ('The Book on Geminate Verbs'), an essay on the morphology of verbs whose second and third radicals are identical. Each of these books has two parts: theoretical introductions and alphabetically arranged lexical entries. The book on the hollow verbs contains a general introduction and four introductions to the four groups of weak verbs: one to *prima alef*, one to *prima yod*, one to verbs with a medial weak radical and one to verbs with a final *he*. In the general introduction, Ḥayyūj formulated two basic rules: (a) Following Arab Grammarians, the rule that every Hebrew verbal root consists of at least three letters. Hence, if a verbal form contains less than three radicals, it is defective and its trilateral root can be figured out by analogy (*qiyyāṣ*) to the strong verbal root. (b) The rule of 'hidden' quiescent letters: the letters *'alef*, *waw*, *yod* and final *he* in contrast with all other consonants (letters) can be 'hidden' quiescents, i.e., not-pronounced but written, and sometimes not-written. They nevertheless function in the structure of the root of the verbal form.

The rule of trilaterality was known to Arab Grammarians already in the eighth century. In Arabic, because of its schematic structure due to analogy, trilaterality is quite conspicuous and the trilateral root, especially in verbs, prevalent. In Hebrew, due to prehistorical evolution, trilaterality is somewhat obfuscated. Linguists of the tenth century—Saadya, Alfāṣī, Menaḥem—failed to recognize it, and when faced with verbal forms which contained less than three radicals, they established biradical or even uniradical verbal roots. The verbal forms derived from these roots were recalcitrant to any morphological analysis and the roots themselves were unreasonably overloaded with homonymy. Hence any progress in the morphological study of the Hebrew verb was hampered all throughout the tenth century. It is by the means of the ingenious notion of those 'hidden' letters that Ḥayyūj established 467 weak trilateral roots (17 *prima 'alef*, 46 *prima yod*, 125 medial quiescent, 164 final *he* and 115 geminate roots) and described the derivation and inflection of their verbal forms by analogy to the strong trilateral verb. He succeeded in founding the morphology of the Hebrew verb, thus providing a new basis for the study of Hebrew grammar.

Ḥayyūj's two books raised a controversy that dominated the first half of the eleventh century: by the second decade of the century Ibn Janāḥ (Arabic, Abū al-Walīd Marwān, known as Rabbi Yonah) (first half of the eleventh century; Cordoba and Saragossa) had written his *Kitāb Al-Mustalḥaq* ('The Book of Critical Addition') in which he completed what Ḥayyūj had 'overlooked': more than 50 roots not mentioned by Ḥayyūj, some additional 50 meanings of roots, more than 100 verbal forms (conjugations, tenses), 50 different interpretations and some 40 theoretical points. In a few instances he even rejected the analysis of Ḥayyūj, suggesting his own solutions. Samuel ha-Nagid (Ar. Ismail ibn Nagrel'a) (933–1055/56; Granada) wrote *Rasā'il Al-Rifāq* ('The Epistles of the Companions') in which he objected to some of the comments made by Ibn Janāḥ in his *Kitāb Al-Mustalḥaq*. To this, Ibn Janāḥ replied in his *Kitāb Al-Tashwīr* ('The Book of Shaming') which Ibn Janāḥ often mentioned with pride (only a few small fragments of it reached us). Samuel ha-Nagid replied in turn in his *Kitāb Al-Ḥujja* ('The Book of Evidence'). Yonah ibn Janāḥ again replied in *Kitāb Al-Taswī'a* ('The Book of Rebuke') to other objections that ha-Nagid and his associates had voiced against *Kitāb Al-Mustalḥaq*. A work entitled *Kitāb Al-Istifā'* ('The Book of Exhaustive Treatment' that Ibn Janāḥ disparagingly called

Kitāb Al-Istikhfā'—'The Hidden Book') was written in Saragossa, adding criticism on the works of Ḥayyūj which Ibn Janāḥ had not dealt with in *Kitāb Al-Mustalhaq*. Ibn Janāḥ replied to this work in *Risālat Al-Tanbīh* ('The Book of Admonition'). *Risālat Al-Taqrīb Wa-Al-Tashīl* ('The Epistle of Bringing Near and Making Easy') is another work of Ibn Janāḥ in which he explained difficult passages in the introductions of Ḥayyūj. However the controversy did not deal with the principles and rules exposed by Ḥayyūj in the theoretical introductions. On this, agreement was unanimous and without reservations. The controversy was on details exposed in the lexical entries. Even in the second half of the thirteenth century a late-developing echo of the dispute surrounding the works of Ḥayyūj was heard in Meir b. David's *Hassagat Ha-Hassagah* in which he defends Ḥayyūj against the criticism of Ibn Janāḥ in *Kitāb Al-Mustalhaq*. This literature of 'objections' and 'replies' is the written expression of penetrating seminary discussions which took place orally among intellectuals in Spain during the first half of the eleventh century. In these disputes the study of language was ever increasing in depth and refinement, and linguistic tradition became more and more consolidated. Indeed, the investigation of the language never again attained such fine and sharp distinctions as those in the controversy which developed around the works of Ḥayyūj in the generation of Ibn Janāḥ and ha-Nagid.

In the 1040s, far from the noise of the dispute, Ibn Janāḥ and ha-Nagid settled down to summarize their teachings. Ha-Nagid wrote his *Kitāb Al-Istighnā*' ('Book of Amplitude'), a large dictionary of BH, which in many ways (such as scope, arrangement of entries, wealth of references, and the precise mention of earlier authors) is perhaps the zenith of BH lexicography. It was lost however, and only a few small remnants have survived. Ibn Janāḥ set down with the wisdom of age a complete description of BH in his work *Kitāb Al-Tanqīḥ* ('The Book of Minute Research'), which consists of two parts: *Kitāb Al-Luma*ʿ ('The Book of Variegated Flowerbeds'), a grammar, and *Kitāb Al-Uṣūl* ('Book of [Hebrew] Roots'), a dictionary. The grammar consists of an introduction and 45 chapters. One can get some idea of the scope of the work by classifying its chapters according to the pattern of traditional grammar accepted today.

Ibn Janāḥ's work begins with the division of parts of speech, with which his predecessors had already dealt, but he improves on the definitions of Saadya Gaon and their logical foundation. The different types of 'expressions' (sentences) are also classified in this chapter. Matters of pronunciation are considered in 13 chapters: the 'letters', each one's articulation, and its position in the word, whether as base or supplemental letter. The meanings of the supplemental letters are given the most detailed discussion extant. Interchange of letters is also treated, as well as assimilation. Vocalization, too, is discussed: interchange of vowels, the changes which occur in vocalization in the vicinity of the laryngeals, the vocalization of the conjunctive *waw* (including *waw* conversive), and of the interrogative *he*. This concludes the issues of pronunciation.

The grammar of the word—derivation and accidence—is treated in 13 chapters; the formation of the word, i.e., the derivation and the accidence of the verb and the noun, is treated in a unit which runs for five chapters. Pronominal suffixes, relation (*nisba*), plural and dual forms, determination and indefiniteness, genders, and numbers are also discussed.

The other chapters of the work deal with topics which are today included under syntax and rhetoric. Seven chapters are devoted to syntactical topics, including apposition, government of the verb, the construct case, and agreement in gender. Five chapters cover rhetoric: ellipsis, pleonasm, repetitio, inverse order—forward or backward. Five of the six remaining chapters discuss classified groups of exceptional occurrences which the grammarian cannot include under any of the rules which he formulated. Therefore, Ibn Janāḥ uses an astute operative device called *taqdir* ('surmise'), by means of which he formulates in Hebrew the intention of the written expression, thus removing its exceptional character. He now analyzes the surmise instead of the exceptional expression.

This attempt to present the subjects of the work according to the main topics of grammatical description today is likely to distort Ibn Janāḥ's division of the material and the methodological principles underlying it. Ibn Janāḥ—following in this the Arab Grammarians—did not divide grammar into the accepted sections of today, such as phonology, morphology, and syntax.

In his dictionary, Ibn Janāḥ stabilized the internal arrangement of the lexical entry. In general, at the start of an entry he lists the meaning which he considers the main one and then gives its derivative forms in which this meaning is found. He defines the biblical citations grammatically. For the verb, he notes conjugation paradigms, tense and so on, and for the noun its pattern, its forms in *status absolutus* and *constructus*, gender, and number. After listing the other meanings, he draws attention to the relation between the various meanings of the entry. Not intending to make an exhaustive list of the forms, he offers a small selection of illustrations which are to suffice for the explanation of the meanings of the root and for an understanding of the forms derived from it. He does not, however, discuss grammatical issues extensively, but instead refers the reader to his *Kitab Al-Luma*' and to his other works. He is very brief with weak roots since he does not intend to repeat the statements of Ḥayyūj or those statements he already made in his *Kitāb Al-Mustalhaq*, but he does treat in detail strong roots, particles, nouns from which no verbs are derived, nouns of size and weight, plants and animals. Thus in the work of Ibn Janāḥ a balance is established within each entry between the semantic definition of the root and the grammatical definition of the forms derived from it.

This two part work, together with the writings of Ḥayyūj and the shorter works of Ibn Janāḥ mentioned above, constitute the first complete description of biblical Hebrew, and no similar study comparable in scope, depth, and precision was made before modern times. This description constitutes the high point of linguistic thought in all the literature under discussion.

We know of 20 works composed between 1050 and 1140, mainly monographs on specific linguistic topics in which their authors tried to go more profoundly into the works of their great teachers of the first half of the eleventh century. Moshe b. Samuel ibn Giḳaṭilla (second half of eleventh century; Cordoba and Saragossa) wrote a monograph on gender; Yehudah ben Bal'ām (Arabic, Abū Zakariyyā Yahyā ibn Bal'ām) (second half of eleventh century; Toledo and Seville) wrote three monographs: one on particles, one on denominative verbs and one on homonymy. Isaac ibn Barun (fl. ca.1100; Saragossa and Malaga) wrote his *Kitāb Al-Muwāzana Bayna Al-Lugha Al-'Ibrāniyya Wa Al-'Arabiyya* (Book on Comparison between Hebrew and Arabic), which is a monograph on the similarities and differences between Hebrew and Arabic written in Spain around 1100 AD. It contains a short grammatical chapter and a long lexical part, of which about two-thirds—789 dictionary entries—have been preserved and published. From the beginning of the twelfth century the first comprehensive dictionary of the Talmuds reached us as well as the Midrashim and the Gaonic literature composed by Nathan b. Yeḥiel (1035–ca.1110) in Rome, and from the first half of the same century we have the first grammar of Samaritan Hebrew *Kitāb Al-Tawṭi'a* ('Book of Introduction') by Abū Ishaq Ibrāhīm b. Faraj b. Marūth (Damascus, Syria).

2.3 *Period III: The Popularization of Hebrew Linguistics (1140–1250)*

In the wake of the 1148 Almohad invasion and persecutions, Jewish scholars emigrated from Spain mainly to Provence and Italy taking with them their Arabic libraries. They began to teach their contents to students who did not understand Arabic but knew Hebrew. This was accomplished in two ways, by producing Hebrew summaries and Hebrew translations. Abraham Ibn Ezra (1089–1164; born in Toledo, a wandering scholar in the East and in the West as well) wrote during his wanderings in Italy and France between 1140–1164 eight books which are nothing more than summaries of the works of Ḥayyūj, Ibn Janāḥ and ha-Nagid. In 1161 Salomon Ibn Parḥon (twelfth century; born in Qal'a, Spain, emigrated to Salerno, Italy) wrote his *Maḥberet He-'Arukh*. It is so faithful a representation of the works Ḥayyūj and Ibn Janāḥ that it was once mistaken for a condensed translation of them. Joseph Ḳimḥi wrote his *Sefer Zikkaron* in Narbonne.

Meanwhile, Spanish exiles began to translate into Hebrew the most important works that had been written in Spain. Moshe ben Samuel ibn Giḳaṭilla had already translated the two important works of Ḥayyūj by the third quarter of the eleventh century, thus being the first to render grammatical works from Arabic into Hebrew. Abraham ibn Ezra translated the works of Ḥayyūj again, apparently in Rome in 1140. Judah ibn Tibbon (ca.1120–ca.1190; born in Granada, Spain, emigrated to Lunel, Provence) completed his translation of *Kitāb Al-Tanqīḥ* of Ibn Janāḥ in 1171 at Lunel (Provence), calling it *Sefer Ha-Dikduk*: the first part of it, *Kitāb Al-Luma'*, under the title *Sefer Ha-Riqmah*; and *Kitāb Al-Uṣūl* under the name *Sefer Ha-Shorashim*. There is also an anonymous translation of the three monographs of Yehudah ben Bal'ām. Outstanding in this work of popularization was the Ḳimḥi family which emigrated to Narbonne, Joseph and his two sons, Moshe (d. ca.1190, in Narbonne, Provence) and David, known as 'Radaḳ' (ca.1160–ca.1235). They wrote five books, the most important being *Sefer Mikhlol*, a complete description of BH by David Ḳimḥi (not later than 1235). This work is shaped in the same way as the *Kitāb Al-Tanqīḥ* of Ibn Janāḥ. It also consists of two parts: a grammar, *Mikhlol*, and a lexicon, *Sefer Ha-Shorashim*. For the content he drew upon the works of Ḥayyūj and Ibn Janāḥ, apparently in their Hebrew translations, and upon the works of popularizers who preceded him. In the *Mikhlol* the theoretical foundations, the methodological clarifications, the substantiations and explanations were reduced and the mechanical, technical, paradigmatic side prevailed. The author gave prominence to the verb, devoting much space to it. This work of David Ḳimḥi, did more than any other to spread the ideas of Ibn Janāḥ among the Hebrew-reading intellectuals. It is the one which helped cause Ibn Janāḥ's own works to be forgotten. While the two parts of *Sefer Mikhlol* were printed many times (*Sefer Ha-Shorashim* from 1480, and *Mikhlol* from 1532–34), the works of Ibn Janāḥ himself were not published, even in their Hebrew translations, until the second half of the nineteenth century. At the end of the period under discussion, Moses b. Isaac (ben Hanesi'ah) (thirteenth century; England) wrote *Sefer Ha-Shoham*, the first linguistic work written by a Franco–German Jew upon the basis of the linguistic theory of the eleventh century grammars, as found in the writings of Abraham ibn Ezra, Ibn Parḥon, and Joseph Ḳimḥi, and in the translation of the works of Ḥayyūj and of al-Mustalhaq.

Although these works of adaptation and translation obviously made but a slight original contribution to linguistic thought, it would be difficult to exaggerate the importance of this scholarly activity. It was the translators and adaptors who saved Hebrew linguistics from oblivion in the West and made it a permanent branch in the history of Jewish literature. They translated into Hebrew the Arabic grammatical terms used in the works of Ḥayyūj and Ibn Janāḥ and established a Hebrew expository style for linguistic description that has existed until today in the study and teaching of the Hebrew language and in Hebrew Bible exegesis.

2.4 Period IV: Stagnation (1250–1550)

This period in the West bears the stamp of the almost exclusive influence of the works of Period III, primarily that of David Ḳimḥi's *Mikhlol.* Since the works of Period II were written in Arabic, they fell into oblivion in the West and *Mikhlol* became *the* formulation of Hebrew linguistics, the authoritative source for grammarians and lexicographers. The unshakable prestige of *Mikhlol* was further strengthened by the widespread distribution of David Ḳimḥi's Bible commentary. Science progresses through controversy and the unshakable authority of *Mikhlol* proved detrimental to Hebrew linguistic thought. Most of the books of this period are of a practical nature, such as introductions, text books or learning aids to punctators of the biblical text. However, attempts were made sporadically at widening the scope of linguistics: a short work on meter, works on poetics based on Aristotle, a long work on rhetoric based on Cicero and Quintilian, a few dictionaries on postbiblical Hebrew, two thesauri of synonyms, rhyme dictionaries, a Hebrew–Persian dictionary, a Hebrew(–Aramaic)–Italian–Arabic dictionary, a first concordance of BH, Bible Glossaries with Romance (Provençal, French, Italian) translations, etc.

A small number of works are concerned with theoretical issues. First, the demand for basing linguistics upon logic began to make itself felt. This tendency is already felt in *Ratukot Kesef* ('Chains of Silver') by Joseph Ibn Kaspi (1279–1340; Provence). It is prominent in *Ma'aseh Efod* composed in 1403 by Profiat Duran (d. ca.1414; born in Perpignan, lived in Catalonia) which also contains criticism of *Mikhlol.* This reaction against the mechanical nature of *Mikhlol* is in a way a dialectical return to the theoretical nature of *Kitāb Al-Luma'*. Secondly, contact with Latin linguistics increased. This influence is especially noticeable at the very end of the period. In 1523 at Venice, Abraham de Balmes (ca.1440–1523) composed a Hebrew grammar, *Miqneh Avram*, together with a Latin translation, *Peculium Abramae.* In it he tries to apply the ideas of Latin grammar to the description of the Hebrew language. Thus he devotes the seventh chapter, entitled Harkavah ('composition') to the syntax of the Hebrew word. This work, together with *Ma'aseh Efod* of Profiat Duran, constitutes the most important theoretical contribution of the period. At the very end of this period, Eliyah Levita, known as Eliyahu Baḥur (1468/9–1542; born in Neustadt, near Nuremberg, spent most of his life in Italy) wrote Hebrew grammars, Hebrew and Aramaic dictionaries, and Masoretic research. In 1506 Johann Reuchlin (1455–1522; born in Pforzheim, Baden) published his *De Rudimentis Linguae Hebraicis.* Based on David Ḳimḥi, it is the first noteworthy Christian work for the instruction of Hebrew to non-Jews. In Basle in 1524, Sebastian Münster (1489–1552; born in Ingelheim, lived in Heidelberg and Basle) wrote *Institutiones Grammaticae in Hebraeam Linguam* (in Hebrew: *Melekhet Hadiqduq Hashalem*) which is based on the work of Eliyah Levita. Thus, research into the Hebrew language ceased being exclusively Jewish and became part of European culture; with this too, a new period in the history of Hebrew linguistics began.

3. Selected Topics

3.1 The Status of Biblical and Post-Biblical Hebrew

Around the year 1000 AD, writing about linguistic issues was a new phenomenon in Jewish literature. It was considered by many important people as a vain, senseless activity. Therefore in their introductions the authors discuss the motivating factors which stimulated them to write their linguistic works. They seek to prove to their readers that it is incumbent upon Jews to take up the investigation of their language. Hebrew linguistics had a twofold purpose: to increase the knowledge of the language and thereby aid the understanding of the written word, and to provide Hebrew writers with a suitable literary tool, preventing them from deviating from the rules of the exemplary language of the Bible.

Hebrew linguistics dealt mainly with the language of the Bible. This language is considered complete and ideal. There is harmony and balance in its structure; it has been measured in the scales of justice and law; its rules are logical and its expressions clear. It is free of error and contradiction; everything in it can be explained and substantiated. Yet these characteristics are not obvious from the actual text, rather being hidden in it, so that it is the main task of grammar to reveal them after detailed investigation. Such investigation thus becomes the main object of the grammarian. This self-imposed limitation to biblical Hebrew is already noticeable in Saadya Gaon's grammar, *Kutub al-Lugha*, in which he discusses nothing but the grammar of the Bible. This attitude prevailed among the authors who followed him, and lasted for centuries.

All types of postbiblical Hebrew, including *mishnaic* Hebrew (*Mishna* is a Hebrew collection of six tomes dealing with religious law redacted, arranged and revised at 220 AD), were marked as inferior, for the fate of the language supposedly resembled that of the people. During the entire period under discussion, not even one grammar on *mishnaic* Hebrew was written, nor any one work which described BH and *mishnaic* as one language. Still, *mishnaic* Hebrew was granted a special status; since the sages lived and worked at a time closer to the prophets, it was assumed that details of language which were not included in BH remained in the *Mishnah*. Therefore, they used the *Mishnah* for their works, especially for understanding difficult works, such as *hapax legomena*. This comparison, mostly lexical, was already begun by Saadya Gaon in *Al-Sab'īn Lafẓa Al-Mufrada* ('The Seventy Hapax Legomena'). Yehuda Ibn Quraysh (second half of the tenth century; Tahert, Algeria) followed him in his *Risāla* ('Epistle'), and all the others continued it. Ibn Janāḥ in *Kitāb Al-Luma'* compares BH to *mishnaic* 28 times, and in *Kitāb Al-Uṣūl* 307 times. Needless to say, it never occurred to these grammarians to describe the Hebrew used in post-*mishnaic* texts, such as *piyyuṭim* (Hebrew liturgical poetry from the first centuries AD onwards). They neither listed their forms nor explained their words. They did not even deal with the Hebrew used in the writings of their contemporary Hebrew poets. Only infrequently did they cite a verse of poetry, and then it was not because they were interested in a practical description of its language, but rather to criticize or invalidate it, or to endorse it in accordance with usage found (whether frequently or rarely) in the Bible, or according to a virtually possible form of BH.

3.2 The Dependence of Early Hebrew Linguists on Arab Grammarians

As stated earlier (see Sect. 2.2), authors of the creative period (1000–1140) drew amply upon Arab grammarians for theory and methodology, expository devices and terminology. Ibn Janāḥ in his grammar used extensively though tacitly the works of Arab linguists: Sībawayhi (d.796), al-Mubarrad (d.898), Ibn Al-Sarrāj (d.928), al-Zajjāji (d.949) and Ibn Jinnī (d.1002). But he did not use them slavishly:

(a) Arab grammarians centered their attention on *i'rāb*, i.e., the final vowels of the noun and the prefix conjugation of the verb and on their syntactical function. BH had lost the vocalic endings in its far prehistory and therefore Hebrew linguistics could not use this dominant part in the works of Arab grammarians.

(b) BH and Classical Arabic differ in many parts of their structure (number of vocalic qualities, the shewa, the 'hidden' quiescent, etc.). Therefore, Hebrew linguistics could not imitate Arab grammatical theory and methodology slavishly, they adapted it to the structure of BH and to the operative needs of the Hebrew linguists.

(c) Arab Grammarians were not the only metalinguistic source of Hebrew linguistics. For parts of the description they drew on the *Masora* literature (see Sect. 1) and even on earlier sources (*Sefer Yetzira*, third century AD, Talmudic and Midrashic sources) and they used Hebrew and Aramaic terms in their Arabic exposition. Ḥayyūj used 21 Hebrew and Aramic terms and their derivations, Ibn Janāḥ used 27. Arab grammarians derived from the Arabic root *fā-'ayn-lam* terms to designate the conjugation forms of the verb. Ḥayyūj, following in this his Arab teachers, forged 67 Hebrew terms from the Hebrew corresponding root *pe-'ayin-lamed* and used them for the same purpose in his Arabic exposition, e.g., instead of using the Arabic term *infi'āl* he forged a Hebrew term *mif'al*, etc. He was followed by all other Hebrew linguists who wrote in Arabic. Of course, the newer the topic, the heavier the dependence on Arab grammarians, e.g., for numerals, pronouns, *status constructus* etc.

(d) Jewish linguists being well-versed in three semitic languages (Hebrew, Judeo-Aramaic, and Arabic) made constantly explicit comparisons of Hebrew with its two cognate languages, especially with Arabic (see following section).

3.3 Comparisons with Aramaic and Arabic

It was in one field only that Hebrew linguistics surpassed their Arab teachers, namely in comparing explicitly and systematically Semitic languages. Whereas Arab authors, such as Ibn-Ḥazm (b.994; born at Cordoba) had at best some inkling of the relationship between Arabic and Hebrew, Hebrew linguists, by their plurilingual experience and traditional education were well-versed in three semitic languages: they spoke some Arabic vernacular, and before the age of 13, Jewish boys read and understood (via translation) BH, Post-BH, and Jewish Aramaic. They lived in *diglossia* with bi-trilinguilism. These three languages being cognate, knowing them implies being aware of their structural similarities and differences on all levels. Small wonder that early Hebrew linguists qua trilinguals specified these basic parallels explicitly in their comparative statements.

Yehuda Ibn Quraysh and Dunash ibn Tamīm (ca.890–after 955/56; died in Kairuwan, Tunisia) were the founders of this branch in Hebrew linguistics. Ibn Janāḥ compares Hebrew to Aramaic 10 times in his grammar and 266 times in his dictionary. He also compares Hebrew with Arabic 56 times and 254 times respectively. The comparison reached its climax with Ibn Barun's monograph. In the Hebrew linguistics between Saadya (900) and Ibn Barun (1100) we have 2291 comparisons, 568 with Aramaic (25%) and 1723 with Arabic.

Thus Early Hebrew linguists not only made a complete description of BH but also dealt objectively with their interlingual associations apropos BH and produced a coherent body of systematic comparative statements. With the transfer of the center of Hebrew linguistics from Arabic-speaking lands to Europe, this branch of Hebrew linguistics, its most original contribution, fell into oblivion.

Bibliography

Bacher W 1892 *Die hebräische Sprachwissenschaft vom* 10. *bis zum* 16. *Jahrhundert*. S Meyer, Trier. Repr. Benjamins, Amsterdam 1974

Bacher W 1895 *Die Anfänge der hebräischen Grammatik*. Deutsche Morgenländische Gesellschaft, Leipzig. Repr. Benjamins, Amsterdam 1974

Becker D 1995 Ibn Janāḥ's Arabic Sources. *Rubinstein Festschrift*: 143–68. Tel-Aviv (In Hebrew)

Chomsky W 1952 *David Ḳimḥi's Hebrew Grammar*. Bloch, New York, New York

Dotan A 1971 Masorah. In: *Encyclopaedia Judaica* (English), Vol.8, pp.1401–82. Macmillan, Jerusalem

Dotan A 1977 Wilhelm Bacher's place in the history of Hebrew Linguistics. *Historiographia Linguistica* **4(2)**: 135–157

Hirschfeld H 1926 *Literary History of Hebrew Grammarians and Lexicographers*. Milford, London

Hirschfeld H 1931 Hebräische Sprache, grammatische Literatur bei den Juden, a) von den Anfängen bis zur Mitte des 16 Jhts. In: *Encyclopaedia Judaica* (German), Vol.7, pp.1066–75. Eschkol, Berlin

Maman A 1984 *The Comparison of the Hebrew Lexicon with Arabic and Aramaic in the Linguistic Literature of the Jews from Rav Saadia Gaon* (*10th cent.*) *to Ibn Barun* (*12th cent.*) (Hebrew). PhD thesis, Hebrew University, Jerusalem

Téné D 1971 Linguistic literature. Hebrew. In: *Encyclopaedia Judaica* (English), Vol.16, pp.1352–90, 1399–1401

Téné D 1972 Ibn Janāḥ, Jonah. In: *Encyclopaedia Judaica* (English), Vol. 8, Keter, Jerusalem, pp.1181–86

Téné D 1980 The earliest comparisons of Hebrew with Aramaic and Arabic. In: Koerner E F K (ed.) 1980 *Progress in Linguistic Historiography*, pp.355–77. Benjamins, Amsterdam

Téné D 1983 Linguistic comparison and linguistic competence (of the Arabic speaking Jews in the 10th–11th centuries). In: *Ben Ḥayyim Festschrift*, pp.237–87. Magnes Press, Jerusalem (In Hebrew)

Wilensky M 1930 Chajjudsch Jehuda. In: *Encyclopaedia Judaica* (German), Vol.5, pp.190–98. Eschkol, Berlin

Arabic Linguistic Tradition

Yasir Suleiman

The Arabic linguistic tradition spans centuries of intellectual activity and covers a wide range of topics, all pertaining to the Arabic language in its capacity as, primarily, the medium of religious expression (in the form of the Qu'rān) as well as a vast body of poetry. Participants in this tradition came from a variety of ethnic backgrounds; for example, al-Khalīl (d.791); Sībawayh (d.804) and Ibn Jinnī (d.1002), the three most important scholars in the core disciplines of this tradition, were Arab, Persian, and Byzantine by origin respectively. But they all engaged in their work from a position which recognizes the centrality of Arabic and Islam in the life of the community of which they were a part.

In addition to the ethnic diversity of the major participants in the Arabic linguistic tradition, this tradition was shaped not just by scholars whose expertise lay only in the field of linguistic studies, but also extended to include contributors from outside the strict confines of this domain. Ibn Sinā's Treatise (*Risāla*) on the points of articulation of the Arabic speech sounds (Semaan 1963) shows that linguistic science was not the exclusive preserve of linguists, but that a philosopher and medical scholar could contribute to aspects of this field, drawing, obviously, on his expertise in his primary field of research.

As understood here, the Arabic linguistic tradition covers two major areas: grammar in the wide sense (including phonetics phonology, morphology, and syntax) and lexicography which deals with the compilation of lexica. Serious research in these two areas dates back to the eighth century. It was al-Khalīl who, together with his student Sībawayh (al-Nassir, 1993), laid down the foundations of grammar; but the credit in the development of lexicographic work is al-Khalīl's alone.

This article will concentrate on grammar and lexicography. Also, aspects of semantics and pragmatics will be dealt with. But first the beginnings and fundamental principles (*uṣūl*) of Arabic grammatical thinking will be outlined.

1. The Beginnings of Arabic Grammar

The beginnings of Arabic grammatical thinking are universally attributed in the sources to the emergence of the phenomenon called *laḥn* (solecism) in early Muslim society. As explained in these sources, *laḥn* is a socially induced phenomenon which primarily emerged from the events and conditions set in train by the rapid spread of Islam and the conversion to it of large numbers of speakers of languages other than Arabic. New converts to Islam had to familiarize themselves with their adopted religion, especially its primary text, the Qu'rān, which prides itself on being revealed in 'clear Arabic.' Not unexpectedly, their speech was faulty, and, if what the sources say is accepted, faulty speech later spread to the Arabs themselves who mixed with these new converts in the newly conquered lands.

Broadly speaking, the term *laḥn* initially referred to the deviations from the pre-descriptive patterns of Arabic, as those patterns were assumed to be intuitively grasped by authentic speakers of the language in its pure and uncontaminated form, the ultimate repositories of which being the Qu'rān and early poetry. Various reports in the literature show that *laḥn* obtained not only in ordinary speech, but also in recitations of the Qu'rān. The occurrence of *laḥn* in the latter domain was viewed with alarm by those who were in a position to do something about it, as it represented a dangerous interference in the total veracity of the message of the Qu'rān in its capacity as the revealed word of God *verbatim*. It is in this context that Abū al-Aswad al-Du'alī was entrusted with the task of placing the hitherto untranscribed short vowels in the text of the Qu'rān. However, contrary to what the Arabic sources say, this undeniably important contribution cannot be seriously regarded as the 'official' beginning of grammar, simply because it does not amount to any publicly formulated descriptive statement of the structure of Arabic.

The above discussion is important because it throws serious doubt on the almost universal claim in the Arabic sources that Abū al-Aswad was the originator of Arabic grammar. It is also important because it points to two main considerations which played a significant role in the rise and development of Arabic grammar. The first consideration pertains to the importance of grammar as an indispensable tool in the promotion of the full range of scholarly activities which revolve around the Qu'rān, for example exegesis (*tafsīr*) and jurisprudence (*fiqh*). The second consideration is the role of grammar as a pedagogic instrument in the teaching of Arabic to, primarily, non-Arab converts to Islam, as well as to those Arabs whose speech was, or might have been, affected by *laḥn*. Clearly, in its inception, Arabic grammar was not an end in itself, but a means to something else. This, however, did not prevent it from being largely built on premises, or from utilizing notions and techniques, which are germane to providing immanent descriptions of the language.

2. The Foundation of Arabic Grammar

Most of the seminal work on Arabic grammar was carried out by al-Khalīl and his student Sībawayh, whose *Kitāb* constitutes the most original and full-fledged description of the Arabic language of the Qu'rān and poetry. Al-Khalīl and Sībawayh set the tone for Arabic grammatical thinking by offering an approach which was largely synchronic in character, albeit that Arabic grammar contains copious, but unsystematic, references to phenomena of a diachronic nature. Furthermore, by primarily concentrating on the supradialectal form of the language, al-Khalīl and Sībawayh relegated dialect studies to a secondary place in the totality of the Arabic grammatical tradition. In addition, description in the *Kitāb* is largely anchored in relation to the written forms of the language, even with respect to phonological processes, in spite of the fact that Sībawayh, building on the work of al-Khalīl, gives a thorough phonetic analysis of the Arabic speech sounds in, chiefly, articulatory terms. The existence of all three features as defining properties of the Arabic grammatical studies is clear testimony of the strength of the legacy bequeathed by these two linguists.

2.1 *The Fundamentals* (*uṣūl*) *of Arabic Grammar*

Attested data (*samā'*) and analogy (*qiyās*) are the two most important fundamentals of Arabic grammatical thinking. A third, less important, fundamental is the presumption of continuity (*istiṣḥāb al-ḥāl*). As will become clear from the discussion below, these fundamentals cover three different, albeit related, dimensions of Arabic grammatical thinking.

2.1.1 *Attested Data* (*samā'*)

Attested data fall into two categories: transmitted data, mainly constituting the Qu'rān and poetry, and elicited data. Each one of these categories of data will be dealt with below. First the reasons offered by the grammarians for excluding the Prophet's Traditions (*ḥadīth*) from the scope of transmitted data will be set out.

The first argument in this connection concerns the fact that the majority of Traditions were not *verbatim* records of what the Prophet had said, but that they represented the gist of what was said, moulded in the language of the transmitter. The second consideration pertains to the problem of *laḥn*, the general assumption being that since many non-Arab Muslims participated in the transmission of the Traditions, and since *laḥn* was regarded as a property of the speech of speakers from this background, there was no guarantee that the Traditions were not contaminated by *laḥn*.

However, these arguments seem to have been discounted in the work of the thirteenth-century grammarian Ibn Mālik (d.1273).

3. Transmitted Data

3.1 *The Qu'rān*

The Qu'rān is universally regarded as the primary source of linguistic data in the Arabic grammatical tradition for two reasons. On the one hand, it is thought to represent God's revealed word verbatim and, as such, it is regarded as the most eloquent/clear (*faṣīh*) text there is in the whole of the Arabic language. On the other hand, it is revealed to the Arabs through the medium of Muhammad, who was considered as one of the most eloquent members of his community on account of the fact that he combined the eloquence of the Meccans, his own people, with that of the tribe of Banū Sa'd, among whom he was brought up.

However, the Qu'rān is not a totally uniform linguistic text, as is evident from the existence of the variant readings (*qirā'āt*) which represent phonological, morphological and, to a lesser extent, syntactic variations in the Qu'rān. Arab grammarians adopt the position that all attested variant readings of the Qu'rān are valid data for analysis and description. But they split into, roughly, two camps with regard to the validity of these readings as bases for generating new utterances through analogy. On the one hand, the Baṣrans insist that only those readings of the Qu'rān which conform to the general patterns of the language can serve as models for analogical derivation. On the other hand, the Kūfans hold the view that all variant readings, including the ones which represent rare features of the language, are eligible to serve as models for generating new items in the language. The Kūfan-inclined grammarians argue that rare variant readings of the Qu'rān are as much a part of the language as the rest.

3.2 Poetry

The utilization of poetry as a source of transmitted data reflects the importance of this literary genre in the life of the Arabs. The general position held by the Arabic grammarians vis-à-vis the validity of poetry as data source favors its restriction to specimens prior to the Abbāsid period. However, it is not unknown for later grammarians to use the poetry of Abbāsid poets as a source of data. Clearly, the attitude of the Arabic grammarians toward poetry was not totally uniform, and the best one can hope to do here is to outline some of the considerations which were applied in the selection of poetry of the early period of Islam as data source.

The first consideration is the remoteness of the poet from urban life, the underlying assumption here being that contact with speakers from the urban centers endangers the linguistic competence of the poet through *laḥn*. A second consideration is the excellence of the poetry from the thematic and stylistic points of view. A third consideration is the lexical and grammatical robustness of the poetry. Obviously, different selections were made depending upon which considerations were applied. However, the subjectivity of these considerations, particularly the latter two, led to a great deal of uncertainty in the reliance on poetry as linguistic data.

3.3 Elicited Data

The transmitted data of the Qu'rān and poetry were augmented by data directly elicited from speakers whose speech was judged to be eloquent/clear (*faṣīḥ*). As understood in this context, the concept of eloquence/clarity (*faṣāḥa*) applies to speakers whose linguistic behavior was judged to be devoid of *laḥn*. Speakers of this type were generally believed to be members of Quraysh, the Prophet's tribe, or any of the tribes which continued to live in the heart of Arabia (*ahl al-wabar*) and, thus, had no, or very little, contact with the urban population (*ahl al-madar*). However, this theoretical position was not always totally respected in practice.

Two types of setting were resorted to in eliciting data from native speakers. In the first setting, the grammarians traveled deep into the desert to meet members of the tribes which shunned contact with the urban world. In the second setting, the grammarians elicited data from speakers who visited the markets which sprang up around the urban centers on the edge of the desert, notably al-Mirbad outside Baṣra. These settings are mentioned here to emphasize the point that the Arabic grammarians took data collection very seriously in their work.

However, the data elicited by the grammarians were defective in at least three important ways. First, the reliance of the grammarians on memory and their utilization of a less than phonetically adequate script to record their observations adversely affected the accuracy of their data. Second, the concentration of the grammarians on the segmental dimension of speech meant that the paratactic aspects of the language were largely excluded from the data. Third, the data were almost exclusively restricted to male speech; thus, there is very little indication of the type of language employed by females. Grammar was the preserve of males who concentrated on male speech.

4. Analogy (Qiyās)

Analogy is the soul of Arabic grammar. According to one famous definition in the literature 'grammar is nothing but analogy which is to be followed' (Suyūṭī: *Iqtirāḥ* 94). Anbāri (d.1181) specifies grammar as 'knowledge of the analogical patterns which are extracted from the speech of the Arabs by means of induction' (*Luma'* 44). He further declares that 'it is not possible to deny the existence of analogy in grammar because the whole of grammar [is based on] analogy' (ibid). This view of grammar is sanctioned by Sībawayh and Ibn Jinnī.

Analogy is used in a variety of senses in the literature. In the predescriptive sense, it is used to refer to the intuitively conceived patterns of the language which underlie the speaker's ability to encode and decode utterances in the language concerned, in this case Arabic. In the postdescriptive sense, analogy incorporates the general patterns of the language which the grammarians established by, inter alia, applying the inductive method to the attested data. Analogy also refers to the use of the general postdescriptive patterns of the language to generate novel data. It is also used to designate the generation of what might be called hypothetical data in morphology, a process the purpose of which is to inculcate in the learners a conscious knowledge of the patterns of the language. In the latter sense analogy acquires a pedagogic dimension, which is different from the primarily structural dimension implicit in the other senses of analogy above.

Analogy in grammar serves a variety of functions, the most important of which is the rationalization of the descriptive facts of the language by means of *taʿlīl* (explanation). In this sense analogy breaks down to four components: the base (*aṣl* or *maqīs ʿalaihi*), the subsidiary (*farʿ* or *maqīs*), the *ʿilla* (rationalization, cause, reason, or norm) and the verdict (*ḥukm*). To illustrate how analogy works in Arabic grammar, the well-known example in the literature involving '*inna* and its sisters' will be considered.

A characteristic feature of '*inna* and its sisters' is their occurrence with a subject (*ism*) in the accusative and a predicate (*khabar*) in the nominative, as the following example illustrates:

inna akhāka Muḥammadun (1)
subj (acc) pred (nom)
'Your brother is Muhammad.'

This property of '*inna* and its sisters' is explained in Arabic grammar by invoking their similarity to transitive verbs in sentences exhibiting the linear order Verb–Object–Subject, instead of the normal Verb–Subject–Object in which the object (*mafʿūl bihj*) appears in the accusative and the subject (*fāʿil*) in the nominative, for example:

ḍaraba akhāka Muḥammadun (2)
V Obj (acc) Sub (nom)
'Muhammad hit your brother.'

The constituent components of the analogy invoked to systematize/rationalize the aforementioned property of '*inna* and its sisters' may be specified as follows:

(a) base: the transitive verb in V–O–S sentence types;
(b) subsidiary: *inna* and its sisters;
(c) verdict: the occurrence of the accusative with the object and the nominative with the subject in sentences of the above type; and
(d) *ʿilla*: *inna* and its sisters govern a subject (*ism*) in the accusative and a predicate (*khabar*) in the nominative by virtue of resembling the base (a) which is characterized by the verdict (c).

4.1 The ʿilla

The concept of *ʿilla* is one of the most important concepts in Arabic grammatical thinking. This concept has received a variety of classifications, and an article of this type can only outline the major senses in which it has been used in the literature.

An important sense of the *ʿilla* is that of grammatical pattern, rule, or norm, particularly when viewed from the perspective of pedagogical grammar. Seen from this perspective the *ʿilla* serves the function of helping the learners acquire the correct linguistic habits, thus enabling them to encode and decode utterances in the language accurately. Used in this sense, the *ʿilla* is labeled pedagogical (*taʿlīmiyya*) by Zajjājī (d.948), primary (*ūlā*) by Ibn Maḍāʾ (d.1196) and just *ʿilla* by Ibn al-Sarrāj (d.929), although it is viewed as being equally descriptive in function by the latter linguist.

Another important sense of *ʿilla* is that of a rationalization whose aim is to explain a significant feature of the language. *ʿillas* of this type are called analogical *ʿillas* by Zajjājī when applied in the fashion set out in the example at the end of the preceding section. Ibn Maḍāʾ refers to *ʿillas* of this type as secondary (*thawānī*), but he does not accept them all. He only accepts a subtype of the secondary *ʿillas* which he calls the absolutely necessary *ʿillas*.

A third sense of *ʿilla* is that of a rationalization used in debates about the nature of the language as a medium of communication, conducted in a cultural context dominated by the principle of the wisdom of the Arabs (*ḥikmatu al-ʿArab*) as native speakers of the language. Zajjājī refers to *ʿillas* of this type as *naẓariyya-jadaliyya* (reflective/theoretical–argumentative), while Ibn Maḍāʾ refers to them as tertiary *ʿillas*. The latter linguist, however, rejects *ʿillas* of this type because they often violate the empiricism of grammar which, in terms of his Ẓāhirite views on the nature of linguistic inquiry, is interpreted in relation to what may be called observable surface structure phenomena. Ibn al-Sarrāj does not distinguish between the latter two types of *ʿilla*, treating them as just one type. These different views and classifications of *ʿilla* serve to show the complexity of this concept.

Another important classification of the *ʿilla*, albeit less known than Zajjāji's, is provided by Ibn Jinnī in his famous work *al-khaṣāʾiṣ*. Ibn Jinni distinguishes between what he calls obligatory/mandatory *ʿilla* (*mūjiba*) and optional *ʿilla* (*mujawwiza*), the latter he also calls reason (*sabab*) to indicate that it is not a full-fledged *ʿilla*. Broadly speaking, the difference between these two types of *ʿilla* may be stated by saying that the former offers causal explanations of linguistic data while the latter generally offers teleological ones.

4.2 Presumption of Continuity (istiṣḥāb al-ḥāl)

This is the least studied fundamental in the foundations of the Arabic grammatical tradition. It is invariably relegated to a marginal status in treatises on the *uṣūl* (fundamentals) of Arabic grammar. This attitude is best represented in the work of Anbāri, although this linguist invokes it in a few places in his famous *Inṣāf*. The status of this fundamental (in Arabic grammar) reflects its status in jurisprudence whence it was borrowed.

Broadly speaking, the presumption of continuity fundamental is framed in terms of the view that linguistic features, whether items or patterns/rules, have two dimensions: an 'emic' dimension, which represents their abstract aspect, and an 'etic' or concrete one, which pertains to variations in the realization of the emic elements. This boils down to saying that the etic elements are exponents of the emic ones which, that is the latter, have priority in description.

In Arabic grammar the etic features represent deviations from the norms, these being the emic elements. Deviations of this type are anchored in description in relation to their emic sources by the two processes of interpretation (*ta'wīl*) and explanation (*ta'līl*). Within this overall framework, the presumption of continuity fundamental boils down to saying that features in the language are treated as emic unless they can be shown to be different. In instances where the tentative emic elements turn out to be emic proper, the processes of interpretation and explanation do not apply.

4.3 The Schools of Grammar

Arabic grammar does not constitute a totally uniform set of theoretical and procedural principles, yielding universally acceptable descriptive results. Differences between the grammarians existed, resulting in the recognition of two major trends (*madhhab*) named after the two centers in which they had originally developed: Baṣra and Kūfa in modern Iraq (Goldziher 1994).

The term *madrasa* (school), used in place of what was called *madhhab* in the preceding sentence, was given currency mainly by modern scholars, particularly Shawqī Ḍaif in his now famous book *al-Madāris al-Naḥwiyya* (The Schools of Grammar). What is interesting to point out here is that this shift in nomenclature has generated heated, but perhaps unnecessary, debate as to whether the above schools warrant this label, in the sense of their being coherent models with sufficiently irreconcilable differences between them in theoretical and methodological orientation. Had the modern grammarians continued to apply the term *madhhab*, instead of the ill-fitting *madrasa*, to designate each group of grammarians, the *Baṣran* and the *Kūfan*, much of the heat would have been taken out of the debate, thus creating a more balanced perspective to assess the differences between them. A sober look of this kind would have shown that the differences between the Baṣrans and the Kūfans were differences of degree not kind.

The main differences between the Baṣrans and the Kūfans concern the two fundamentals of attested data (Sect. 2.1.1) and analogy (Sect. 4). As far as the former is concerned, the Kūfans did not apply the same rigid considerations which their Baṣran counterparts used in the selection of informants for the elicitation of data. Unlike the Baṣrans, the Kūfans sanctioned the use of bedouin speakers as informants, even when they were known to have had extensive contact with the urban population whose speech was judged to be grammatically suspect from the point of view of correctness. Although this is generally true, preference was always given by the Kūfans to informants who had very little or no contact with the urban population. With respect to the second fundamental, the Kūfans, unlike the Baṣrans, sanctioned the use of 'rare data' as bases for analogical creations of new utterances. The Baṣrans accepted attested rare data as part of the language, but they were extremely hesitant to use such data as the base or models for the analogical creation of new utterances.

Other differences existed between the Baṣrans and the Kūfans, but these are largely limited to the provision of different descriptive solutions to the same data and, in certain instances, to the employment of different terminologies.

The above differences between the Baṣrans and the Kūfans are best treated as variations on the same themes, or as divergences in degree, not kind. This conclusion is supported by the fact that differences existed in each group, creating fuzziness in theoretical orientations and tastes whose ultimate effect was to blur whatever flimsy boundaries existed between the two overarching groups. Furthermore, differences exist in the literature as to the total number of schools, in addition to the Baṣrans and the Kūfans, which obtained in the Arabic grammatical tradition. If this indicates anything, it shows that the theoretical and procedural grounds upon which the various schools are established are not rigorously defined. As a matter of fact, it seems that the chief consideration in attaching the label 'school' to a group of grammarians is primarily the fact that they operated in the same center in the Arabic and Muslim worlds, whence the labels the 'Andalusian School,' the 'Baghdad School,' the 'Egyptian School,' the 'Maghreb School,' and the 'Syrian School.' With Modern Arabic scholars, grammatical schools became like national airlines in modern times: each country/area must have one as a sign of its own identity and progress.

5. The Organization of Arabic Grammar

What must be avoided here is the temptation to force Arabic grammar into the all too prevalent orientation in modern linguistics to view models or theories as constructs consisting of fairly well-defined components which interact with each other in a (specified) manner. The Arabic grammarians viewed grammar as a coherent totality, but within this totality they recognized two major portions: morphology and syntax, the former often not easily distinguishable from what some modern linguists would call morphophonology. Arabic grammar also deals with issues of semantics and pragmatics as well as with phonology and phonetics (Bohas, et al 1990).

5.1 Morphology

As has been mentioned in the preceding section, morphology is very closely linked with morphophonology in Arabic grammar. The primary notion in this portion of grammar is the *kalima*, which primarily designates a unit of the language similar to the word in structuralist and other approaches. But the same notion is also used to designate discrete morphemes which stand in a relation of prefixation or suffixation to the word in its capacity as a stem, for example the definite article and the sound masculine plural morphemes respectively.

It is clear from this brief presentation that the word in Arabic grammar is regarded as the central notion in morphology, and that it is viewed as an uninterruptable unit of the language. The latter feature of the word may be regarded as a reflection of an implicit bias in Arabic grammar toward treating linearity as a relevant feature of grammatical constructions.

Morphology is dealt with extensively by Sībawayh in his *Kitāb*. The foundations laid down by this grammarian were later extensively developed by Ibn Jinnī in his two books *al-Khaṣā'iṣ* and, especially, *al-Munṣif* which is almost totally devoted to the task of expounding this area of linguistic description in Arabic. The major notions in this area will be outlined in this section (for a fuller treatment see Bohas 1984 and Owens 1988).

A basic concept in morphology is the distinction between simple, unanalyzable or aplastic words (*jāmid*) and complex, derived or analyzable ones (*mushtaqq*). Considered from the perspective of the tripartite classification of words (*kalim*) into word classes, simple words are typically represented by members of the particle word class, for example prepositions, while substantives (*asmā'*) and verbs (*af'āl*) typically represent complex words. Morphology is restricted to words of the second category only, i.e., complex or derived words. However, complex here is not synonymous with polymorphemic (as the following discussion will show) although certain words are recognized as polymorphemic.

Take the derived word *kātib* which is usually glossed as 'writer (m.).' The morphological complexity of this word is explained in terms of its composition of a triliteral root *k-t-b*, which is given a vocalic pattern—represented by the vowels *ā-i* after the first and second consonants respectively—to create the structure or form (*binā'*, *wazn*) *kātib*. The meaning of the derived word *kātib* emerges from the interaction of the abstract lexical meaning of the root, which may be stated as 'something to do with writing,' and the equally abstract notional/functional meaning of the vocalic pattern visualized in relation to the root, which may be stated as 'agentive.' Clearly, in Arabic grammar the complexity of derived words is conceived in terms of their composition of consonantal roots and vocalic patterns which, together as a totality, may be further expanded by utilizing the sounds of augmentation (*ḥurūf al-ziyādah*): (*s*, *'*, *l*, *t*, *m*, *n*, *w*, *y*, *h*, *ā*). It should be added here that the majority of the derived words in Arabic are reduced to triliteral roots. However, there is a minority of derived words in the language which consist of 4 or 5 root consonants.

This mode of generating words in Arabic is called minor derivation (*ishtiqāq aṣghar/ṣaghīr*) and is often taken to mean the same thing as *taṣrīf* (a term that is better left untranslated to avoid confusion). Ibn Jinnī recognizes a second type of derivation which he calls major derivation (*ishtiqāq akbar*). Major derivation refers to the observation that the set of permutations of a triliteral root all share the same semantic import. Ibn Jinnī illustrates this type of derivation by the six permutations of the root *k-l-m* which share the overall arching meaning of 'power and strength.' The idea of major derivation was not original with Ibn Jinnī, as it was already present in the work of his mentor Abū 'Ali al-Fārisī (d.978). However, the genesis of this type of derivation may be traced all the way back to the process of factorization which al-Khalīl applied in his lexicon *al-'Ayn* to calculate the lexical stock of the Arabic language (see Sect. 7).

Major derivation has a marginal status in Arabic morphology, as does the process of blending (*naḥt*) which is used to produce new words by concatenating parts of two or more words to create a new word, in very much the same way as the English word 'smog' is created from the underlined elements in smoke and fog. A typical example of a blended word in Arabic is *basmalah* which is formed from the constituent parts of the religious formula: *bismillāhi al-raḥmāni al-raḥīm* (In the Name of God, the Compassionate, The Merciful). Blending has the status of being a marginal word-formation process in Arabic because it involves a very small number of items in the language.

The phenomenon of *i'rāb* (desinential inflection) covers the two categories of case and mode, and is treated in Arabic grammar as a morphosyntactic phenomenon, with the main emphasis being placed on its syntactic dimension. In a similar fashion, certain entities which would be treated as bound morphemes from the point of view of modern linguistic theory, for example the attached personal pronouns, are treated as primarily syntactic in nature in Arabic grammar. These two examples show that the delineation of morphology and syntax in Arabic grammar is based on grounds that are different from those which would be set up for this language in terms of modern linguistic theory. It is also clear from the earlier discussion in this section that what is called derivation in Arabic grammar is significantly different from derivation in modern linguistic theory. This is why it is important to avoid the recent tendency in the literature of hastily casting Arabic grammar in the light of this or that linguistic theory, often on the basis of facile comparisons.

5.2 Syntax (*naḥw*)

Syntax is the other major area of Arabic grammar. The principal concern of syntax is the analysis of sentences into, ultimately, words, and the assignment of grammatical functions to these words, with special emphasis on the way these functions are formally marked by the desinential inflections in substantives and verbs (*i'rāb*). The Arabic grammarians recognize a type of entity approaching in status the phrase in modern linguistic theory. However, this entity is not established as a fully functioning unit on a full-fledged level of analysis between the sentence and the word.

Syntax in Arabic is dominated by the principle of governance or, more traditionally, regency (*'amal*), whose primary purpose is to account for the occurrence of desinential inflections (*i'rāb*) in words in their capacity as components of larger units. The principle of governance (regency) revolves around a triad of notions: the governing entity (*'āmil*), the governed entity (*ma'mūl bihi*) and the effect of the former on the latter (*'amal*), this being the occurrence of the syntactically appropriate desinential inflection in substantives and verbs. The following example will be used to illustrate these notions:

ḍaraba Muḥammad-un 'Aliyy-an (3)
hit Muhammad-nom 'Ali-acc
'Muhammad hit Ali'

In this example the verb *ḍaraba* is said to be the governing entity (*'āmil*) of the two governed entities (*ma'mūl bihi*) *Muhammadun* and *'Aliyyan*, producing the effect (*'amal*) of controlling the former in the nominative and the latter in the accusative.

The governing entity in the above example is said to be overt/expressed in the sense that it is formally marked as an entity in the body of the sentence. In other instances, the governing entity may be covert in the sense that it is not formally marked as a unit in the sentence. Thus, in the following nonverbal sentence:

al-walad-u nashīṭu-un (4)
the boy nom industrious nom
'The boy is industrious.'

the subject/topic (*mubtada'*) *al-walad-u* is said to be in the nominative by virtue of its being the inceptive element in the sentence. Here, the governing entity is inception or topicalization (*ibtidā'*) and the governed entity is the subject *alwalad-u* which is in the nominative, this morphosyntactic category being the effect of the former on the latter.

An important feature in the discussion of the principle of governance is the set of conditions that are placed on the governing and governed entity. It would be impossible to state all these conditions here. The following are given for illustrative purposes only:

(a) the governing entity precedes the entity it governs;
(b) no entity can be governed by more than one governing entity; and
(c) the entities which govern the substantives are 'stronger' than those which govern the verbs.

The uncompromizing application of the governance principle in Arabic grammar gives rise to a number of notions whose purpose is to ensure that governance applies uniformly throughout the language. Chief among these notions are *iḍmār* (deletion or ellipsis) and *taqdīr* (paraphrase). To illustrate the former notion, consider the following examples.

In the sentence:

qāma Muḥammad-un (5)
stood up Muhammad-nom
'Muhammad stood up.'

the governing entity *qāma* precedes the governed subject/agent (condition (a) above) which is in the nominative. However, if the order of these two entities is reversed as in:

Muḥammad-un qāma (6)

then *Muḥammad-un* ceases to be treated as a governed entity of the verb because it precedes it, with the result that the occurrence of the nominative with this substantive is attributed to topicalization/inception in its capacity as the governing entity. But this leaves the governing verb without a formally expressed governed subject. To deal with this situation in terms of the governance principle, the verb is said to govern a deleted/ellipted subject *huwa* (he). Clearly, deletion, at least in contexts of this type, is a corrective strategy whose main purpose is to iron out awkward situations which emerge from the application of the governance principle throughout the grammatical portion of the language.

The recoverability of the deleted element in (6) above is determined by the structural properties of the sentence. In other instances, the recoverability of a deleted element may be determined only by reference to contextual or pragmatic factors. See the following well-known example:

al-hilāl-u wallāhi (7)
def-crescent-nom by God

is said to correspond to the sentence:

hadhā al-hilālu wallāhi (8)
'This is the crescent by God.'

in which the deleted element *hadhā* is recovered by reference to factors pertaining to the situational context.

One of the topics dealt with in discussions of the principle of governance is whether the governing entity/governor is related to linguistic structure or the speaker himself. The predominant view in the literature is that it is the former, although grammarians like al-Fārisī, Ibn Jinnī, Ibn Maḍā', and al-Astrabādhī consider the possibility that the speaker is the ultimate governor of the elements which occur in his linguistic utterances. At least as far as Ibn Jinnī is concerned, the adoption of this view—peripheral though it may be in his approach—represents his *mu'tazilite* predilections which, in scholastic theology, decree that man is the ultimate creator of his own actions, including speech.

The influence of scholastic theology on the principle of governance is, however, more pervasive. To a certain extent the governance principle in grammar echoes some of the salient properties of *ta'līl* (explanation) by means of causes (*'illas*) in scholastic theology. Thus in the same way as every governed entity must be controlled by a governor in grammar, every effect must be governed by a cause in scholastic theology. Similarly, in the same way as no governed entity can be controlled by two governors, no effect can be produced by two or more causes in scholastic theology.

The principle of governance held full sway in syntax, the only dissenting voice being that of the Andulusian grammarian Ibn Maḍā' al-Qrṭubī. This grammarian argued against the application of this principle in grammar because its descriptive consequences transcend the surface, observable structure of utterances in the language, thus leading to an unacceptable degree of speculation. He also opposed this principle because its application requires the setting up of corrective methods, for example deletion/ellipsis, which distort the language by introducing into its utterances extraneous elements. In this, Ibn Maḍā' based his approach on the literalist Ẓāhirite views of Ibn Ḥazm in jurisprudence who rejected all attempts to tamper with the surface forms of the Qur'ān because that would amount to the falsification or fabrication of this text.

5.3 Semantics and Pragmatics

Arabic grammar adopts a predominantly formal approach to the setting up of its grammatical categories, including word classes, in the sense that it relies, inter alia, on properties of form—as opposed to meaning—and the distributional properties of entities in the language. However, semantic observations are not totally excluded from the scope of grammar. For example, Sībawayh's classification of sentences into *mustaqīm ḥasan* (syntactically and semantically well-formed), *muḥāl* (ungrammatical), *mustaqīm kadhib* (syntactically well-formed but semantically unacceptable in terms of our knowledge of the world), *mustaqīm qabīḥ* (awkward, albeit grammatically well-formed) and *muḥāl kadhib* (ungrammatical and semantically unacceptable in terms of our knowledge of the world) shows an awareness of the importance of semantic consideration in grammar, particularly with regard to the question of the acceptability of sentences by native speakers.

Arab grammarians also deal with the semantically based notions of synonymy and antonymy, as well as with homonymy which is partly semantically anchored. They also deal with portions of the lexicon of the language utilizing concepts which correspond to hyponymy and hyperonymy in modern semantic theory. Furthermore, the Arabic grammarians invoke meaning as a consideration to iron out grammatical discrepancies in sentences, as, for example, when a masculine substantive is made to agree with a feminine verb, in verbal sentences, against the established grammatical rules of the language. The main method in dealing with this situation is *al-ḥamlu 'alā al-ma'nā* (semantic correspondence) which interprets one of the entities, in this case the substantive, as being a legitimate constituent of the verbal sentence concerned by virtue of its semantic correspondence to another substantive which fits the context from the point of view of gender concord.

In later stages of Arabic grammar, the grammarians developed the disciplines of *'ilm al-bayān* and *'ilm al-ma'ānī*, utilizing in this regard the views of earlier scholars. Broadly speaking, the main objective of *'ilm al-bayān* is to deal with issues of metaphor and metaphorical meanings. *'ilm al-ma'ānī* deals with a variety of issues, chief among which is the correlation of sentential meanings with the variations in their constituent arrangements, in the light of the different pragmatic functions served by these permutations of constituents. Clearly, *'ilm al-ma'ānī* starts from the assumption that the main function of language is communication and that, within this framework, meaning assumes primary importance. Jurjāni (d.1078) is the leading grammarian in the development of this branch of Arabic linguistic studies. Central to his approach is the importance of context as a factor in the proper analysis of language as a communication tool, with textual and situational contexts being given pride of place in this respect.

Jurjāni's work has attracted scholarly attention because it revolves around notions which are closely akin to some principal ideas in discourse analysis, particularly with respect to the organization of information in sentences. One of the main notions in this regard is that of placing important items before less important ones with respect to the pragmatic force of the message to be conveyed. Another important notion is that of treating the organization of constituents in sentences in terms of the parameter of new/old information.

6. Lexicography

The compilation of lexica started at a very early stage in the Arabic linguistic tradition. It is generally agreed in the sources that the impetus behind the emergence of this activity was the overriding one of providing an aid to the study of the meaning of the Qu'rān, as well as the preservation of its message as understood by the early Muslims before their language was affected by *laḥn*. The primacy of this objective imposed its limitations on the type of materials which were regarded as valid data for lexicographic work. Broadly speaking, lexical materials were culled from the Qu'rān and the poetry of the pre-Islamic and Islamic eras up to around the middle of the second century Hegira. Furthermore, in the elicitation of data from subjects the lexicographers tended to rely on informants who were judged to have had little or no contact with the urban population to guard against the inclusion of materials affected by *laḥn*.

Lexicographic work in the Arabic linguistic tradition is very diverse in nature. With respect to their organization, lexica may be based on a phonetic/phonological classificatory principle (as in *al-'Ayn* by Al-Khalīl) or on the essentially graphologically-based alphabetical principle of letter arrangement (as in Ibn Duraid's *al-Jamhara*). Notional lexica group items together on the basis of their membership in lexical domains, for example *al-Mukhaṣṣaṣ* by Ibn Sīdah (d.1066). There are also specialized lexica which list the items relevant to a particular field of inquiry, for example *al-Tadhkira* by al-Anṭāki (d.1405) which deals with medical treatments. In all these lexica items which share the same root are grouped together into one principal entry headed by the root in question (see Sect. 5 for 'root'). Thus, all the items which share the root *k-t-b*, for example *kātib* (writer), *maktaba* (library), would be listed under the root concerned. However, this general organizational principle is sometimes modified by the introduction of other classificatory principles. To illustrate this point, the Arabic lexicographic practice will be looked at in more detail by considering four different lexica, each representing a fairly well-defined trend in this domain.

The first lexicon is the famous *al-'Ayn* by al-Khalīl which has the distinction of being the oldest lexicon, in the full sense of the term, in the Arabic linguistic tradition. Al-Khalīl organized the root entries in his lexicon in terms of the mode of articulation of the first element in each root, starting from the back of the vocal tract and moving forward to the front of the mouth. Another important feature of *al-'Ayn* is the fact that it lists all the permutations of a root under the same entry, with the choice of entry being subsumed under the permutation which contains the letter with the highest order in the phonetic/phonological spectrum established in terms of the first principle above. Thus, in terms of this principle, the set of root permutations *k-t-b*, *k-b-t*, *b-k-t*, *b-t-k*, *t-b-k*, *t-k-b*, would be listed under the letter *k* because its phonetic reflex is produced further back in the mouth than the reflexes of *t* or *b*. Furthermore, of the two *k* initial roots *k-t-b* and *k-b-t*, the former would take precedence over the latter because the phonetic reflex of the second radical letter *t* is produced further back in the mouth than that of *b*. However, since not all the permutations of a root may be lexically active, al-Khalīl distinguishes between root permutations which correspond to actual words in the language and those which represent what may be called phonological, or potential, words.

The second lexicon is *al-Jamhara* by Ibn Duraid (d.933). This lexicographer arranges the entries in this lexicon first in terms of the number of radicals in the root, starting with biliteral roots and ending with roots which consist of five radicals. The entries within each root class are then arranged serially by reference to the position of the first letter in the root in the overall alphabetical hierarchy of the letters. Entries under each letter subclass are then subjected to a further listing principle whereby they are arranged on the basis of the serial ordering of the letters of the alphabet, starting with the letter of the subclass concerned, and moving down the hierarchy of letters until the roots are exhausted. Thus, under the letter (ج = *j*) in, say, triliteral roots, Ibn Duraid would first list all the roots beginning with this letter followed by (ح = *ḥ*), followed by those beginning with (ج = *j*) and (خ = kh) and so on down the alphabetical hierarchy until all the roots have been exhausted. Ibn Duraid also incorporates the root permutations principle first employed by al-Khalīl. The cumulation of all these principles in the compilation of this lexicon inevitably leads to overloading in its organization which, in turn, makes it rather unwieldy and user unfriendly.

The third lexicon to be considered is *al-ṣiḥāḥ* by al-Jawharī (d.1003). Entries in this lexicon are based on the root concept, following the alphabetical system of subclassification in two ways. First, roots are serially subclassified in terms of the alphabetical order of their last radical; thus roots which end with the letter (ب = *b*) would be listed before ones ending with (ت = *t*) or (ج = *j*). Second, within each subclass entries are arranged serially in terms of the position of their first letter in the alphabetical hierarchy. Thus, within the entries subsumed under the letter (ب = *b*) in the triliteral root class, the root *sh-r-b* would be listed before *k-t-b* because *sh* precedes *k* in the alphabetical hierarchy. Obviously, this lexicon is rather unwieldy to use, but it is extremely useful in poetry because of its bias toward the rhyme (*qāfiya*) which is a characteristic feature of poetry. It seems also to be directed at those engaged in the art of alliterative or rhyming prose.

The fourth lexicon is the one by the nineteenth-century lexicographer and educationist al-Bustānī (d.1883): *Muḥīṭ al-Muḥīṭ*. The main classificatory principle in this lexicon is that of listing roots according to the alphabetical order of their first radicals. Thus, roots which begin with (ب = *b*) precede those which begin with (ت = *t*) and so on until the end of the alphabet, regardless of the number of radicals involved. However, this classificatory principle is not original with Bustānī, as it was employed earlier in different types of lexica. An interesting feature of this lexicon however is its utilization of data which fall outside the scope of the 'principles' of selection outlined at the beginning of this section. For example, Bustānī cites late poets from the Abbasid period, a practice more or less outlawed in the standard lexical works, although this restriction was relaxed by some later lexicographers.

Bustānī's lexicon shows that Arabic lexicography continued well into the nineteenth century, and that the process of development was generally one of simplification for the user, but without relinquishing the central notion of the root owing to its semantic and derivational significance in the language. However, Arabic lexicography in the twentieth century has edged away from this long-standing commitment to the root as a primary classification principle, preferring to arrange entries alphabetically by reference to actual word shapes. Thus, whereas all the words which are built on the root *k-t-b* are all listed under this root, in, say, Bustānī's *Muḥīṭ al-Muḥīṭ*, in al-'Alāylī's *Marji'* they are listed under different entries according to their first letters, with the result that the words *kātib* (male writer) and *maktaba* (library), for example, are listed under the letters *k* and *m* respectively. It must be pointed out, however, that this mode of listing items in modern lexica is not totally foreign to the Arabic lexicographic tradition, although the immediate impetus seems to have come from western lexicography. A major factor in this tentative shift of focus in modern lexicographic practice is undoubtedly the desire on the part of the lexicographers to facilitate the task of looking up words in the language, by reducing the reliance on the grammatical information needed in this connection. Finally, the twentieth century has also seen an explosion in bilingual, mainly Arabic–English/French, and specialized dictionaries to meet the demands of foreign language learners and to keep pace with the development of specialized terminologies.

7. Conclusion

The preceding discussion barely scratches the surface of the rich and varied terrain of the Arabic grammatical tradition. Within this tradition, Arabic grammar developed in the light of insights from the neighboring disciplines of jurisprudence and scholastic theology. The influence of the former is present in the treatment of the fundamentals of the Arabic grammar (Sect. 2.1), whereas the influence of the latter is clear in the development of the principle of governance. Arabic grammar was also influenced by external grammatical traditions, for example Greek and Sanskrit grammars. However, the channels of influence are not always easy to trace. Consequently, one must be careful before one pronounces affirmatively on the possible external sources which are assumed to have fed into the Arabic grammatical tradition.

The Arabic grammatical tradition is not a hybrid of disparate external influences. Rather, it is developed on foundations which are primarily directed by the principal objective of providing a framework for the analysis of the text of the Qu'rān, Arabic poetry, and other types of data. Other objectives do exist, but they are nowhere near this one in their centrality within the Arabic linguistic tradition.

Bibliography

Al-'Alāyhī, Abd al-Alla (n.d.) *Al-Marji'*. Dār al-Mu'jam al-'Arabī, Beirut

Baalbaki R 1983 The relation between *Naḥw and Balāgha:* A comparative study of the methods of Sībawayhi and Jurjānī. *Zeitschrift für Arabische Linguistik* II: 7–23

El-Badry N 1986 The development of the bilingual English Arabic dictionary from the middle of the 19th century to the present. In: Hartmann R R K (ed.) *The History of Lexicography*. Benjamins, Amsterdam

Blanc H 1975 Linguistics among the Arabs. In: Sebeok T A (ed.) *Current Trends in Linguistics*, Vol. 13. Mouton, The Hague and Paris

Blau H 1963 The role of the Bedouins as arbiters in linguistic questions and the *Mas'ala Zanbūriyya*. *Journal of Semitic Studies* **8**: 42–51

Bloch A 1986 *Studies in Arabic Syntax and Semantics*. Otto Harrassowitz, Wiesbaden

Bohas G 1984 *Etudes des Théories des Grammairiens Arabes*. Institut Francais de Domas, Damascus

Bohas G, Guillaume J-P, Kouloughli D E 1990 *The Arabic Linguistic Tradition*. Routledge, London

Al-Bustānī B 1979 *Muḥīt al-Muḥīṭ*. Librairie du Liban, Beirut

Carter M 1981 *Arabic Linguistics*. Benjamins, Amsterdam

Ḍaif S (n.d.) *Al-Madāris al-Naḥwiyya*. Dār al-Ma'ārif bi Miṣr, Cairo

Al-Farāhīdī, al-Khalīl Ibn Aḥmad 1914 *Kitābu al-'Ayn*. Anṣtās al-Karmalī, Baghdad

Al-Fārisī, Abū 'Alī 1978 *'Aqsāmu al-'Akhbār*. *Al-Mawrid* **7(3)**: 201–20

Goldziher I 1994 *On the History of Grammar among the Arabs*. Benjamins, Amsterdam (transl. and ed. by Dévényi K, Iványi T)

Haywood J A 1986 The entry in medieval Arabic monolingual dictionaries: Some aspects of arrangement and content. In: Hartmann R R K (ed.) *The History of Lexicography*. Benjamins, Amsterdam

Ibn al-Anbārī, Abū al-Barakāt 1957 *Asrāru al-'Arabiyya*. al-Majma' al-'Ilmī al-'Arabī, Damascus

Ibn al-Anbārī, Abū al-Barakāt (n.d.) *Luma' al-Adilla fī Uṣūl al-Naḥw*. Almqvist & Wiksell, Stockholm

Ibn al-Anbārī, Abū al-Barakāt (n.d.) *Kitābu al-Inṣāf fī Masā'il al-Khilāf bayna al-Naḥwiyyīna al-Baṣriyyīn wa al-Kūfiyyīn*. Muḥammad Muḥyī al-Dīn 'Abd al-Ḥamīd, Dār al-Fikr, Beirut

Ibn Duraid, Abū Bakr Muḥammad Ibn al-Ḥasan 1344 A H *Jamharatu al-Lugha*. Hyderabad, India

Ibn Jinnī, Abū al-Fatḥ 'Uthmā'n 1954 *al-Munṣif*. 'Idārat 'Iḥyā' al-Turāth al-Qadīm, Cairo

Ibn Jinnī, Abū al-Fatḥ 'Uthmān 1952–56 *al-Khaṣā'iṣ*. Cairo 1952–56. (Reproduced by Dār al-Kitāb al-'Arabī, Beirut, n.d.)

Ibn Maḍā', Abū 'Abbās 1982 *Kitāb al-Radd 'alā al-Nuḥāt*. Shawqī Ḍaif, Dār al-Ma'ārifa, Cairo

Ibn al-Sarrāj, Abū Bakr 1973 *Al-Uṣūl fī al-Naḥw*. 'Abd al-Ḥusayn al-Fatḥ, Maṭba'at al-Nu'mān, Najaf

Al-Jawharī, Ismā'īl Ibn Ḥammād 1979 *Al-Ṣiḥāḥ*. Dār al-'Ilm li al-Malāyīn, Beirut

Al-Jurjānī, 'Abd al-Qāhir 1978 *Dalā'il al-'I'jāz*. Muḥammad Riḍā, Dār al-Ma'ārifa, Beirut

Al-Jurjānī, 'Abd al-Qāhir 1981 *'Asrār al-Balāgha*. Muḥammad Riḍā, Dār al-Ma'ārifa, Beirut

Al-Nassir A A 1993 *Sibawayh the Phonologist: A Critical Study of the Phonetic and Phonological Theory of Sibawayh as Presented in his Treatise 'Al-Kitab'*. Kegan Paul International, London and New York

Owens J 1988 *The Foundations of Grammar: An Introduction to Medieval Arabic Grammatical Theory*. Benjamins, Amsterdam

Owens J 1990 *Early Arabic Grammatical Theory: Heterogeneity and Standardization*. Benjamins, Amsterdam

Peterson D 1972 Some explanatory methods of the Arab grammarians. *Papers from the Eighth Regional Meeting: Chicago Linguistic Society*. Chicago, Illinois

Semaan K I 1963 *Arabic Phonetics. Ibn Sīnā's Risāla on the Points of Articulation of the Speech Sounds*. Sheikh Muhammad Ashraf, Lahore

Sībawayh, Abū Bish 'Amr Ibn 'Uthmān Ibn Qanbar 1983 *Al-Kitāb*, 3rd edn. 'Abdu al-Salām Muḥammad Hārūn, Al-Hay'a al-Miṣriyya, Cairo

Al-Suyuṭī, Jalāl al-Dīn 1976 *Kitāb al-'Iqtirāḥ*. Aḥmad Qāsim, Maktabat al-Sa'āda, Cairo

Versteegh C H M 1977 *Greek Elements in Arabic Linguistic Thinking*. E J Brill, Leiden

SECTION III

Antiquity — the Far East

SECTION III

Antiquity — the Far East

Chinese Linguistic Tradition

William S.-Y. Wang and R. E. Asher

Of all the living languages of the world Chinese has the longest unbroken recorded history, with texts in the language dating from as long ago as 35 centuries, and there is reason to believe that the art of writing in China may go many centuries further back than this. During the greater part of this history Chinese scholars and thinkers have shown an interest in the nature of language. The nature of the development of this interest, however, has been somewhat different from the way in which the linguistic tradition developed in, for instance, India and Europe. The cause of these differences can be seen to lie largely in the typology of the languages involved; and to some extent in the way they were written. Unlike the languages of India, be they Indo-Aryan or Dravidian, and of Europe of two thousand years ago, Chinese grammar made (and still makes) little use of inflectional morphology. In addition, where the writing systems of India and Europe are all essentially alphabetic, Chinese is written with morphosyllabic graphs. These two factors—the nature of the language and the nature of the linguistic tradition—are probably not unrelated. As will be seen in what follows, where much early linguistic speculation in both India and Europe has to do with grammar, the systematic study of grammar tended to play a minor role in China and did not begin in a serious way there until the nineteenth century, and then only as a consequence of European influence.

Over a period of two and a half millenia one can identify a succession of different foci of linguistic scholars' attention. If a certain amount of simplification is allowed and if overlaps are ignored, one can trace a progression from metalinguistic speculation, through lexicography and dialect geography, phonology, the study of tone, work on language change, and psycholinguistics. It is, of course, from the work of some of these scholars that, in spite of the phonetic and phonological opaqueness of the Chinese writing system, it is possible to reconstruct forms from earlier periods of Chinese as, for example, Karlgren has done (Karlgren 1954).

1. Metalinguistic Speculation

The earliest known linguistic thinker of major importance is the philosopher Xun Zi, the date of whose birth is variously estimated as falling at different points within the period 335–313 BC. His best known work is *Zheng ming* (most usually translated as 'The rectification of names'), which goes back to a group of several sentences in the *Analects* of Confucius (Kongzi) of two centuries earlier. Kongzi was concerned with the regulatory function of language, the need to ensure that words are used appropriately. Xun Zi starts from the position that words have 'no intrinsic content' and 'no intrinsic correctness.' It is convention which establishes correctness. So, 'When the convention is established and the custom formed, the words then have content'; and 'When the convention is established and the custom formed, the words are then correct. If they are different from convention, they are then incorrect.' A naturalist stance is nevertheless allowed for up to a point, for Xun Zi states that 'words have intrinsic appropriateness. Those which are direct and not misleading are appropriate words.'

2. Lexicography

During the early centuries of the use of the Chinese writing system there was no standard for the use of characters. It is traditionally held that it was above all the achievement of a disciple of Xun Zi, Li Si, who was chief minister under the emperor Qin Shi Huang Di, to unify the use of the characters. This was done by standardizing their varied shapes into a single format, that of the *xiao zhuan* or 'small seal' (the 'seal script' being so called because of its frequent use on seals). This did not, however, make large numbers of them readily available for those who needed them. For this a dictionary was needed. Such a work was produced in the first century AD by Hsü Shen under the title of *Shuo wen jie zi* ('Explanations of simple characters and analyses of composite characters'). This pioneering work remains one of the most important in the history of Chinese lexicography. Taking the *xiao zhuan* as its foundation, it deals comprehensively with 9,353 characters. Hsü Shen's major difficulty, as has inevitably been the case for all Chinese lexicographers, was that of presenting such a mass of material in a sufficiently systematic way for each individual item to be as accessible as possible. The method he chose was to order them in accordance with a system of 540 radicals (*bu shou*). Because of the correspondence that existed between meaning and shape in the radicals a correspondence which was closer than in the case of modern characters—he chose to base his ordering of radicals on the basis of semantic criteria. The same type of criterion was used for the ordering of the set of characters based on a given radical. One such set, for example, is that relating to the radical 'wood.' Within this set in Hsü Shen's dictionary the names of trees come first, then parts of trees, and then products made from wood. The effect is partially that of a thesaurus. It follows that one of the problems in using a thesaurus, as well as its benefits, is present in a dictionary organized in accordance with these principles. That is to say that a knowledge of a meaning of a character is needed before the user can look it up with a view to finding the meaning. It is with a view to serving the purpose of making readily available the meaning of a character whose shape is already known that modern dictionaries have moved away from the listing of characters in an order based on meaning and followed instead a system based on the number of strokes used in the writing of a character. The concept of the radical of a character as presented by Hsü Shen is nevertheless still a familiar one.

The primary purpose of the *Shuo wen jie zi* is clearly a practical one. It does, however, contain important significant theoretical statements, in that it codifies the *liu shu*, or the six principles according to which the characters are formed. One of these principles is particularly important in a discussion of the nature of the Chinese writing system in the sense that it is a corrective to a widespread but erroneous view that this is entirely nonphonetic. The Chinese characters have been contrasted earlier in this article with writing systems which are basically alphabetic. It is the fact that alphabets in their use relate closely, if not always entirely systematically, to the sequence of phonological segments in the languages for which they are used which has led to the mistaken view that a writing system which has been described in such terms as 'pictographic' or 'logographic' can have no link with phonetic or phonological features of utterance. The *liu shu* principle in question is the third of the six as presented by Hsü Shen, namely that of the *xing sheng* or 'shape-sound.' As the name implies, characters which can be analyzed in terms of this principle are made up of two components, namely *xing*—the 'signific' (which is often the radical)—and *sheng*—'the phonetic.' The phonetic can be used, when a new character is formed, to provide information about the pronunciation of the composite character, while the signific part provides information about the essential semantic features. In presenting such a character in his dictionary Hsü Shen gives first of all the *xiao zhuan* form of the character, followed by a statement of its meaning, with this followed by an explanation of how it relates to a combination of the signific and the phonetic.

It has been calculated that over 90 percent of modern Chinese characters are of this type, a proportion that has increased significantly since Hsü Shen's time. By contrast, of the characters on the oracle bones of 3,500 years ago which provide the first extant examples of Chinese writing, the proportion was 27 percent. It is the fact of the existence of these 'phonograms' that facilitates the transcription into Chinese of foreign words.

The total number of available characters did not remain constant through time. With extensions in the use of the writing system new characters were added to it—partly to avoid the sort of ambiguity that results when a single character is used with more than one meaning. As can be expected, with the increase in the number of characters, the total included in dictionaries increased with the passage of time. Further increases no doubt resulted also from the fact that lexicographers the world over tend to build on the work of their predecessors. Thus the sixth-century *Yu pian* records 12,158 characters, the *Qie yun* of 601 contains 16,917, and the *Guang yun* of 1011 has 26,194 (statistics taken from Norman 1988: 72). In 1039 Ding Du (990–1053) produced the *Ji yun*, which at 53,525 has the highest count of any dictionary up to the late twentieth century.

3. Dialect Geography

Where Hsü Shen can be considered to have based his lexicographical work on the standard, other scholars of comparable antiquity concerned themselves with geographical variations in language, in other words with the diverse dialects spoken in various parts of the Chinese empire. It is known that such work was done in the later part of the Zhou period, which ended in 221 BC with the beginning of the Qin dynasty, but the earliest extant work of this sort is that of Yang Xiong who lived from 53 BC to 18 AD.

Yang Xiong's data were not gathered in the course of what would now be called 'field trips' to different regions of China but in Chang'an, the Han capital, where he would ask questions of soldiers and officials from distant parts whose duties took them to the capital. His findings were reputedly set down (there is some uncertainty with regard to the work's authorship) in *You xuan shi zhe jue dai yu shi bie guo fang yan*, which is usually referred to by the abbreviated form *Fang yan*. Though this work, because of the nature of the Chinese writing system and the way in which the material is presented, provides no direct indication of the nature of phonetic differences, it contains much valuable sociolinguistic information. The author notes not only the different words used to denote given entities in the various regions but also words that were common to a number of areas. Standard forms, or 'elegant speech' (*ya yan*) are also presented and there is mention of words which have gone or are going out of use, the author thus making clear that language varies along two dimensions, the historical and the geographical.

The nature of the regional variations presented by Yang Xiong is not entirely clear. The expression *fang yan*, whose component parts mean respectively 'region' and 'speech' is used in modern times in the sense of 'dialect.' Given the wide extent of the Han empire at the time and the fact that much of the population in regions towards the periphery was not Han, it could well be the case that Yang Xiong was describing different languages as much as different Han dialects. This would partially explain why many of the words he lists are not found in modern Chinese.

4. Phonological Studies

Though Yang Xiong's work provides no phonetic or phonological information about the language of his day, there was in ancient China sophisticated knowledge both of acoustics and of the physiology of speech production. That the former is the case became clear in 1978 with the discovery of a set of 65 bronze bells which were cast 2,500 years ago. These bells can be struck at two different points to produce two distinct musical tones. Clear evidence for the claim relating to speech production is to be found in the second-century BC *Ling shu jing*, a work on anatomy which contains an account of the function of the various organs of speech, including the epiglottis, the uvula, the tongue, and the lips. The description is, however, in very general terms, these particular parts of the vocal tract being described respectively as the door for speech sounds, a pass (perhaps because of the uvula's capacity to open or close off the nasal passage), the engine of speech, and the fan of speech. Nothing is said by way of relating to particular speech sounds the positions that these organs of speech can adopt. This development in Chinese linguistics came much later, and the earliest known instance of an account of places of articulation of speech sound appears towards the end of the *Yu pian* (mentioned above in Sect. 2).

The procedure adopted two thousand years ago to indicate the pronunciation associated with a given character is known as the *du ruo*, or 'read as,' method. That is to say that character X is said to be read as character Y. This method is clearly far from ideal, in that the ability to understand from this how X is to be pronounced is clearly dependent of prior knowledge of the pronunciation of Y. It is an approach to the indication of pronunciation which has a family likeness to *xing sheng* (see Sect. 2 above), the difference being that in *xing sheng* the standard of comparison is not a different character but an element within the same character. That is to say that a formula for *du ruo* would be of the type X=Y, whereas *xing sheng* could be satisfactorily represented by $X=s+p$, the formula indicating that the character X has the signific of s and the phonetic of p, the components that make up X.

It seems likely that the impetus for a new approach was provided by knowledge of a nonindigenous tradition, namely that of India. The phonetic description of speech sounds in India goes back several centuries before the Christian era (see *Ancient Indian Phonetics*). With the spread of Buddhism to China came knowledge of some of the ancient Sanskrit sutras. Just as the knowledge of Asian writing systems has over the centuries stimulated the rethinking of approaches to phonetics and phonology in Europe, so the need to translate and transliterate the Sanskrit sutras led to the development in China of new ideas in these areas.

One of these ideas was *fan qie* ('reverse cut'), of which an early instance is to be found in the *Qie yun*, a dictionary compiled in 601 AD by Lu Fa-yan and his fellow-poets. The aim of *fan qie* was to overcome one of the major difficulties inherent in the *du ruo* approach, which could only work if another word existed which was homophonous with the word whose pronunciation it was intended to indicate. Clearly, where no homophone existed, no such indication could be given. The novelty of the *fan qie* method was to break down the syllable represented by a character into two component parts, namely (a) the initial consonant and (b) the syllable final element(s) and the tone. The appropriate formula in this case is X=A+B, where A is a word with the same initial consonant as X, and B is a word with the same final and the same tone. Just as it would be in most cases a simpler matter as far as English is concerned to indicate the pronunciation of, say, *song* by stating that it begins in the same way as *sob* and ends in the same way as *gong*, rather than by searching for a homonym, so it is easier in the case of Chinese to find a suitable 'A' and 'B' than to find a 'Y' which is homophonous with 'X.' It is an interesting fact that, because of the regularity of the phonetic changes in the history of a language and because of the regularity of the phonetic correspondences in sets of cognate words in related languages or dialects, the *fan qie* method works both across different periods of a Chinese dialect and across different dialects.

It seems certain that another characteristic of the phonology of Chinese existed for some centuries before it was discussed by scholars interested in language. This characteristic is the tonal features found in all Chinese dialects (see also *History of East Asian Phonetics*, sect. 1). It is generally believed that the language was not always tonal and that it acquired tones approximately 3,000 years ago. The first explicit discussion of tones that is known, however, goes back only half as long and is found in the work of Shen Yue (late fifth century AD). The four distinctive tones in the Chinese of his time are described as *ping* 'level,' *shang* 'rising,' *qu* 'departing,' and *ru* 'entering.' Though the number of distinctions is thus clear, the actual phonetic interpretation of each term remains somewhat obscure.

Modern scholarship, in Europe and America as well as in China, has endeavored to reconstruct the phonology, both segmental and suprasegmental, of early periods of Chinese. Such efforts, however, have not been confined to the twentieth century, for they began in China some four centuries ago during the Ming dynasty. An early historical phonologist was Chen Di (1540–1620). Fully aware of the fact that languages change over time, he attempted to reconstruct the pronunciation of the poems of the *Shi jing*, an anthology of 305 poems by different (but unknown) poets compiled in the sixth century BC. The poems themselves cover a period of perhaps as much as 500 years but share a common pattern of rhyming. This latter fact is important in that Chen Di's study of the historical development of Chinese focused on rhyming practices. As is evident from the brief discussion of the *Qie yun* above, this work makes use of the fact that different words rhyme. It was an awareness of the fact that the rhyming patterns and the rhyming groups of the *Shi jing* and the *Qie yun* exhibited significant difference that led Chen Di to state unequivocally, perhaps for the first time in China, that the phonological structure of a language changes over time.

Chen Di's work was built on to good effect by his successors during the Qing dynasty (1644–1912), most particularly during the late eighteenth and early nineteenth centuries, with the work of Duan Yucai (1735–1815) being outstanding. An important part of his work was to expand on the studies of the *Shi jing* collection. These studies had been able to indicate which words in the *Shi jing* could be classified together on the basis of rhyme. They said nothing, however, about the large number of words which did not occur in the collection in a rhyming position. It was Duan Yucai's discovery that, in the majority of cases, the 'phonetic' element in a character allowed almost all characters to be classified on the basis of rhyme. His work on rhyme was further developed by Wang Niansun (1744–1832) and Kong Guangsen (1752–86). Before Duan Yucai the foundations laid by Chen Di had been strengthened by studies of rhyme and tone by Gu Yanwu (1613–82) and Jiang Yong (1681–1726), the former of whom made a comparative study of the rhymes in the *Shi jing* and in the early eleventh-century lexicon *Guang yun* (see Sect. 2 above).

5. Twentieth-century Developments

During the twentieth century, the Chinese linguistic tradition has largely merged into the international community of linguistic scholarship. While attempts to apply models based on European languages to the study of Chinese grammar led to obvious failures during the early 1900s, efforts to investigate Chinese syntax using more sophisticated theories developed in the West promise more useful results. At the same time, such efforts have a reciprocal effect of extending as well as refining and enriching such theories by confronting them with typological features found chiefly in the languages of China.

One example of such enrichment is the incorporation into theories of phonology of the features and methods which are necessary for the analysis of tones (Wang 1967). Previously, phonological theories typically were restricted to the analysis of consonants and vowels, even though they were intended for application to all languages. A more subtle, and perhaps more significant, example of such enrichment is the development of concepts of lexical diffusion, which originally grew out of studies of tonal changes in Chinese dialects. These concepts have stimulated a great deal of innovative work and have significantly deepened the basis of historical linguistics.

The first linguists who could move freely between the Chinese linguistic tradition and that of the West were trained either in America (e.g., Chao Yuen-Ren), or in Europe (e.g., Wang Li). Since the 1950s, however, research institutes in Beijing and in Taiwan have trained many young scholars who are expert in their indigenous tradition and at the same time can contribute to the international scholarly activities in linguistics. These developments led to the formation in Singapore of the first International Association of Chinese Linguistics in 1991.

Bibliography

Bloom A H 1981 *The Linguistic Shaping of Thought: A Study in the Impact of Language on Thinking in China and the West*. Erlbaum, Hillsdale, New Jersey

Forrest R A D 1965 *The Chinese Language*, 2nd edn. Faber & Faber, London

Gough K 1968 Implications of literacy in traditional China and India. In: Goody J R (ed.) *Literature in Traditional Societies*. Cambridge University Press, Cambridge

Guo Jin-Fu 1984 Woguo gudai yanjiu yinyunde shengli he wuli texingde lishi chengjiu. *Yuyan Lunji* **2**: 223–43

Hansen C 1983 *Language and Logic in Ancient China*. University of Michigan Press, Ann Arbor, Michigan

He Jin-Ying 1982 Xianqin zhuzide yuyan lilun. *Yuyan Wenzixue* **10**: 3–10

Hong Cheng (ed.) 1982 *Zhongguo lidai yuyan wenzixue wenxuan*. Renmin Chubanshe, Jiangsu

Hu Shih 1934 *The Chinese Renaissance*. University of Chicago Press, Chicago, Illinois

Karlgren B 1954 Compendium of phonetics in Ancient Chinese. *Bulletin of the Museum of Far Eastern Antiquities*, Stockholm, **22**: 211–367

Lehmann W P 1975 *Language and Linguistics in the People's Republic of China*. University of Texas Press, Austin, Texas

Malmqvist G 1990 La linguistica cinese. In: Lepschy G C (ed.) *Storia della linguistica*. Il Mulino, Bologna, pp. 1–24

Norman J 1988 *Chinese*. Cambridge University Press, Cambridge

Wang Li 1981 *Zhongguo yuyanxueshi*. Shanxi Renmin Chubanshe, Taiyuan

Wang W S-Y 1967 Phonological features of tone. *International Journal of American Lingusitics* **33**: 93–105

Wang W S-Y 1991 *Explorations in Language*. Pyramid Press, Taipei

Zhang Jianmu 1956 Fojiao duiyu zhongguo yinyunxue de yingxiang. *Zhongguo yuwen* **11**: 23–25

Linguistic Thought in Japan

Stefan Kaiser

Japan has a long and proud tradition of scholarship in many areas, but lacks an early systematic thinker of the status of a Pāṇini, even though some influence from Sanskrit studies on early Japanese scholarship can be documented. A systematic approach to language studies was not adopted until the early modern *kokugaku* ('national learning') movement, which emphasized inductive reasoning but also shows some interesting parallels to the mentalistic approaches to language by German philologists in the nineteenth century. It has a still flourishing offshoot in the *kokugogaku* school of Japanese language studies, which has absorbed some Western influence but can be characterized as an example of a linguistic tradition outside the Western mould. It still shows no signs of attempting to merge with mainstream linguistics as introduced from the West in the twentieth century.

1. Linguistic Tradition

1.1 Periods of Language Research History

It is not clear when research into language first began in Japan, but it seems likely that the introduction of the Chinese writing system with its subsequent adaptation to Japanese and the arrival of Buddhism (largely in Chinese translation) in the early centuries AD provided major stimuli. Scholars distinguish an early and medieval period (to 1600 AD), followed by an early modern (1601–1867) and a modern period (since 1868).

1.2 Groups of Linguistic Thinkers in Japan

The perpetrators of linguistic thought in Japan can be divided into a number of groups, which will be accorded different weighting in this article.

(a) Japanese philologists to the early modern period, when language studies were an offshoot of other forms of scholarship such as Buddhist studies, classical Chinese, and Japanese literature;
(b) non-Japanese philologists of the early modern and modern periods working in Japan, whose interest in language again tended to be a by-product of other scholarship;
(c) Japanese researchers of the *kokugogaku* school of Japanese linguistics;
(d) Japanese linguists trained in Western linguistic methodology, working on Japanese and other languages.

This article will concentrate on the Japanese tradition of linguistic thought as seen in (a) and (c), but will make mention of (b) and (d) insofar as they have cross-fertilized the thinking of the earlier groups.

2. The Early and Medieval Period

2.1 Development of the Writing System and Styles of Writing

The Japanese, lacking a writing system of their own, adopted Chinese characters (*kanji*) from about the third or fourth century AD, initially for writing in (classical) Chinese. *Kanji* were soon used phonetically for Japanese proper names, a function that was developed further for expressing the complex inflectional morphology of Japanese, giving rise to the development of the *kana* syllabaries from simplified forms of *kanji*. *Kanji* were also used as translation equivalents for Japanese words and morphemes. As a result of these developments, it became possible to write Japanese freely, and a rich literature emerged from about the eighth century. However, classical Chinese (*kanbun*) remained the medium of scholarly writing for many centuries to come.

Owing to this dichotomy between language for private and literary use (native Japanese) and official and scholarly use (classical Chinese and its offshoots, characterized by containing Japanese elements such as honorifics to varying degrees), the study of matters relating to the Japanese language was accorded low prestige and took place largely in the context of Buddhist and Chinese studies and Japanese poetics, until the national learning movement (*kokugaku*) advocated a return to the values of ancient Japan before Chinese influence, thereby validating the study of things Japanese.

2.2 Chinese and Indian Influences

Early language studies were carried out by Buddhist monks in the temples and by scholars of the Chinese classics at the Confucian academy in Kyoto from about the ninth century. Buddhist-related studies were triggered by the study of the Sanskrit script and sounds (so-called Siddhaṃ studies), which entered Japan with the introduction of Buddhism, and were accorded special attention in the newly established esoteric sects. Buddhist sutras circulated in Japan in Chinese translation, and, as many monks were sent to study in China, there were strong influences from Chinese scholarship in Buddhist-related studies and textual/philological scholarship. Sanskrit and Chinese studies centered on phonetic and phonological descriptions; thus Ennin's *Zaito̲ki*, a record of his studies in Tang China from 840–42 including an account of how he was taught the Sanskrit script and sounds, uses traditional Chinese terminology equivalent to 'dental,' 'nasal,' and 'labial' to explain the sounds of the Sanskrit alphabet. Annen's *Shittanzo̲* (880) compares the phonology of Chinese with Sanskrit, and Myo̲gaku (1056?–1122?) uses examples from Japanese to explain the Sanskrit sandhi.

Scholarship at the Confucian academy, which conducted examinations for aspiring officials on the Chinese model, was mainly concerned with Chinese Confucian classics and poetry. Concordances focused on the correct readings of Chinese characters, initially by quoting Chinese dictionaries and rime dictionaries, and later often by using the *kana* syllabary.

A by-product of Chinese and Buddhist textual study was the beginning of a long tradition of dictionaries and glossaries of Buddhist and Chinese texts, starting with the eighth-century *Shinyaku Kegonkyo̲ ongi shiki*, an extension of a Chinese glossary on the Avataṃsaka (Kegon) sutra, and the ninth-century *Tenrei bansho̲ meigi*, a Chinese–Japanese dictionary.

2.3 The 50-sound Chart

Chinese and Sanskrit influences are thought to account for the development of the so-called 50-sound chart. This table is a phonological arrangement of the Japanese *kana* syllabary, listing syllables with the same vowel in horizontal rows and syllables with an identical or related initial consonant in vertical columns. Table 1 is an adaptation in romanized form of a sound chart from Myo̲gaku's *Hannon-sahô* (1093).

Table 1. An eleventh-century '50-sound chart.'

a	ka	ya	sa	ta	na	ra	ha	ma	wa
i	ki	i	si	ti	ni	ri	hi	mi	wi
u	ku	yu	su	tu	nu	ru	hu	mu	u
e	ke	e	se	te	ne	re	he	me	we
o	ko	yo	so	to	no	ro	ho	mo	wo

The Kunrei system of romanization is used for this table.

As phonemic forms of writing were unavailable in China and Japan (for some reason, the Sanskrit script was not used for this purpose), it was impossible to analyze the typical consonant–vowel combinations of the Japanese syllabary into their constituents. The 50-sound chart arrangement manages to overcome this problem in a way similar to the traditional Chinese *fan-qie* system.

In the *fan-qie* system, two known Chinese characters are used to indicate the initial and 'rime' (the remainder, including the tone) of an unknown third. For instance, *tuŋ*^{1} is induced from *tək*^{4} and *huŋ*^{1} by taking the initial *t-* from the former and the rime *-uŋ*^{1} from the latter.

The 50-sound table can be used in a similar way; Myo̲gaku's *Hannon-saho̲* (from which Table 1 is adapted) explains how to work out the reading of the same *kanji*, *tou* in its Sino-Japanese reading, by locating the intersection of the initials of the Sino-Japanese readings of the two known *kanji*, that is, *toku* (vertical *t-* column) and *kou* (horizontal *-o* row), retaining the ending *-u* of the second. It is thought that the 50-sound chart was devised for working out Sino-Japanese readings from the information given in Chinese rime dictionaries.

For that purpose, the order of vowels and consonants did not necessarily have to follow the above order, and indeed many different orders are found in earlier examples of the chart; the arrangement in Table 1 follows the order of Sanskrit vowels insofar as they can be equated with Japanese sounds, while the consonants are arranged by point of articulation, that is, laryngeal (i.e., glottal and velar) [ʔ, k, j (y)], lingual [s, t, n, r], and labial [ɸ (h), m, w], an arrangement that diverges from traditional Chinese phonology. Later versions settle on the consonant order k, s, t, n, h, m, y, r, w, which parallels the order found in works on the Sanskrit alphabet.

Siddhaṃ studies continued in Japan for some 1,000 years and influenced the phonological studies of the early modern *kokugaku* scholars such as Motoori Norinaga; however, the rare occasions when attempts were made at grammatical studies, as in the 1338 *Hachitenjo̲sho̲*, which explains the eight cases of Sanskrit correctly with Japanese postpositions (but also erroneously by assigning Japanese verb forms to them), appear to have exerted no influence on later studies. Siddhaṃ studies were eventually replaced by Sanskrit studies under influence from the west, in the nineteenth century.

2.4 *Influences from Poetics and Japanese Classics*

The study of poetics was initially influenced by Chinese poetic theory, but soon developed into an area of scholarship in its own right from about the tenth century. It was instrumental in raising the linguistic awareness, notably concerning the correct use of postpositions and inflectional endings, that paved the way for the emergence of figures like Fujitani in the early modern period.

3. The Early Modern Period

3.1 *The* Kokugaku *Movement*

Until the introduction of Western linguistics in the twentieth century, the achievements of language studies by Japanese in Japan were largely in the areas of grammar (especially morphology), and to a lesser degree in phonology. There was, however, an important period in the eighteenth and nineteenth centuries when Japan developed its own approaches to the study of grammar and morphology, which influenced generations of linguists in the *kokugogaku* ('national language studies') mould in the modern period.

Research in medieval Japan was hampered by a tradition of secrecy in which scholarly achievements were passed down from teacher to student orally or in manuscript form. In the early modern period, work gradually came to be published and accessible to all. This coincided with a veritable explosion in the arts and sciences from about the mid-eighteenth century, one aspect of which was the development of objective and inductive ways of reasoning to replace the authoritarian and secretive ways of medieval times.

One of the central concerns of the *kokugaku* movement, which advocated a return to the values of ancient Japan prior to Chinese influence, was research into early Japanese thought and culture through textual study of literary works. This philological approach produced a great body of work on language-related matters.

3.1.1 *Some Early Results*

The first major result of this approach was the commentary by the monk Keichū (1640–1701) on the eighth-century collection of poems, the *Manyōshū*, and its offshoot, the *Waji shōranshō* (1693), which re-established the correct usage of the *kana* groups i/hi/wi, e/he/we and o/ho/wo, whose sounds had coalesced into [i], [ye] and [wo] in noninitial position from about the twelfth century, and established the base for a system of 'historical orthography' which was to become standard until 1946.

3.1.2 *The First Systematic Grammar by a Japanese*

Fujitani Nariakira (1738–79) was the first Japanese scholar (see Sect. 3.3.2 for earlier Portuguese work) to develop a systematic grammar for the Japanese literary language, although his work was left unfinished due to his early death. His celebrated *Ayuishō* has an introduction setting out a part-of-speech theory that was to have a profound impact on *kokugogaku* grammar well over a century later, whereas his idiosyncratic terminology and the fact that he did not found a school limited his influence during the early modern period.

The (1778) *Ayuishō* is a work of great originality and deep insights into the workings of the Japanese language, amazingly free from influence from earlier research except for the work on Chinese particles by Fujitani's elder brother, the Confucian philosopher and Chinese grammarian Minagawa Kien, and possibly other scholars of classical Chinese.

Fujitani's main word classes are *na* (nouns), *yosoi* (verbs and adjectives), *kazashi* (adverbs, etc.), and *ayui* (postpositions and verbal/adjectival suffixes). The criterion for distinguishing the former two is the presence or absence of inflection, and for the latter whether they precede or follow the item which they modify. The *Ayuishō*, Fujitani's only mature work dedicated to one of his word classes, subcategorizes *ayui* on functional and semantic criteria, and explains their usage with plentiful examples from Japanese classical poetry but, unusually for his time, also with colloquial equivalents. The *Ayuishō* is also the first work that deals systematically with historical change, and introduces a six-part division of the history of Japanese.

3.1.3 *The Motoori School*

Motoori Norinaga (1730–1801), influenced by earlier *kokugaku* scholars such as Keichū, consolidated the inductive reasoning approach that distinguished the national learning movement from earlier scholarship, although his tendency to emphasize the superiority of Japanese grammar and phonology over Chinese occasionally distorted his otherwise methodical and logical approach. Motoori Norinaga's greatest linguistic achievement was the codiscovery (with Fujitani) of the *kakari–musubi* agreement principle in his 1771 *Teniwoha himokagami*, and his attempt to treat this principle as triggering predication in the accompanying *Kotoba no tama no o* (1779, printed 1785, 7 vols.).

He also re-established the correct position of the *kana o* and *wo* in the 50-sound chart by examining internal sound correspondences in early Japanese and comparing Chinese rime-dictionary arrangements with equivalent sounds in Sino-Japanese.

Motoori Norinaga established his own influential school of *kokugaku*, which produced noted disciples such as Suzuki Akira and his own son, Haruniwa.

Suzuki Akira (1764–1837) was initially trained as a Confucianist scholar of classical Chinese and was thereby in a position to synthesize earlier work. The widely alleged influence of Fujitani is, however, not documentable: Suzuki did not possess any of Fujitani's works, nor does he mention his name anywhere.

As the title of his most influential work, the *Gengyo shishuron* ('Treatise on the Four Categories of Language,' 1824) indicates, he divides words into four basic classes like Fujitani Nariakira. However, his categorization differs in many respects, and seems to be influenced in both content and terminology by Confucianist scholarship of Classical Chinese. His most original contribution, which has strongly influenced not only younger scholars of his own time such as Tōjō Gimon, but also modern grammarians like Tokieda Motoki, was his distinction between concept words (i.e., nouns, *tai no kotoba*) and relational elements (interjections, sentential adverbs, postpositions, and verbal/adjective suffixes, i.e., particles, *teniwoha*), and his theory that adjectives and verbs are the result of combining the two, that is, semantic content base plus relational ending. He points out that nouns, adjectives, and verbs have reference, whereas relational elements do not, and contrasts concept words (to use his metaphor, 'the tools') with the 'voice of the mind' ('the hand that operates them'). This is an approach to the agglutinative language Japanese that has captured the imagination of generations of Japanese scholars since, but also shows parallels to the approach to language of Wilhelm von Humboldt, who was an almost exact contemporary of his.

Other major works include *Katsuyō kiretsuzuki no fu* (in manuscript before 1803) and *Gago onjōko* (1816). The former organizes the inflectional system of Japanese into eight classes and sets out the way auxiliaries are attached to the different inflectional forms, whereas the latter, a treatise on the origin of language, argues that sound symbolism is the source of many lexical items in Japanese.

Parallels to von Humboldt's characterization of Chinese as lacking surface representation of the category of words that have conceptualized meaning are also found in Suzuki's occasional comparisons with Chinese: word classes are universal, and therefore found in Chinese as well, but their surface representations differ from language to language. Whereas Japanese is unrivaled in the purity of grammatical representation of functional elements, Chinese particles lack such refinement.

Motoori Haruniwa (1763–1828) continued and systematized his father Norinaga's work, especially in the area of verbal inflection. Together with Tōjō Gimon (1786–1843), whose work he influenced, he brought the language studies of the *kokugaku* (national learning) movement to a state beyond which no major results were obtained.

The first scholar to make a clear distinction between regular and irregular inflectional paradigms, Motoori Haruniwa established seven named inflectional groups, four regular and three irregular, with a fourth irregular group described but not included in the charts that make up his *Kotoba no yachimata* (completed in 1806, printed 1808). The nomenclature he establishes, based on the position of the changing vowels in the traditional 50-sound chart order, is essentially the same as still now used in the *kokugogaku* school. He also distinguishes five verb forms, and systematically lists the suffixes that attach to them.

In his other major work, the *Kotoba no kayoiji* (3 vols., 1828), he lists verbs on the basis of what one would call transitive/intransitive and passive/causative distinctions, with explanations that attempt to relate form to meaning. He also analyzes the structure of poems, including modifying-modified relationships, in diagrammatic fashion, in what is seen by some as an attempt to deal with sentence structure rather than the morphology-focused approach that characterizes National Learning language studies.

Tōjō Gimon's *Katsugo shinan* (2 vols., printed 1844), a revised version of his *Kotoba no michishirube* (written 1810, printed 1837), furthered the work of Motoori Haruniwa, with whom he corresponded from age 26, by establishing the six inflectional verb forms still now distinguished in *kokugogaku* school grammar; moreover, he named them on the basis of semantic and functional criteria, distinguishing between imperfective (*mizen*) and perfective (*izen*), final (*setsudan*), verb-modifying (*renyō*), noun-modifying (*rentai*) and imperative (*kegu*).

He simplified Suzuki Akira's parts of speech analysis into three basic categories, nouns, inflected words (i.e., verbs and adjectives) and particles/suffixes, treating other distinctions as subcategories, an analysis that is standard still in the *kokugogaku* school.

Tōjō Gimon also worked on the phonology of Chinese loanwords, where his most important achievement (*Namashina*, first draft 1808, printed 1837) was to show by inductive reasoning that consonantal endings, which had long ago coalesced into *-n*, can be traced back to *-n* and *-m*.

3.1.4 Nationalist Offshoots

In parts, the national learning movement subsequently took on a mantle of nationalist fervor, especially in the person of Hirata Atsutane (1776–1843) and his followers, interfering with the inductive reasoning attitude that had produced such remarkable results earlier. Hirata resurrected the claim made by some medieval Shinto scholars that Japan had its own indigenous writing system, the so-called 'script of the age of god' (*jindai moji*) and even went so far as to produce lists of characters. Some contemporaries were, however, quick to recognize that these were imitations of cursive Chinese characters and Korean *hangul* letters.

3.2 *Characteristics of* Kokugaku *Linguistic Research*

When attempting to summarize the results of *kokugaku* linguistic research, a number of facts stand out.

Like most nineteenth-century linguistic research in Europe, the work of Japanese researchers was historical and prescriptive, dealing almost exclusively with the classical literary style. This emphasis on historical research over the spoken language also characterizes much of the twentieth-century *kokugogaku* school.

Unlike work in nineteenth-century Europe, comparisons with other languages were minimal and superficial, going little further than asserting the superiority of Japanese over Chinese on account of its inflectional regularity (changes quite neatly follow the vertical columns of the 50-sound chart). Partly, this can be attributed to the geographical and political isolation of Japan at the time.

Grammatical analyses were largely restricted to morphology and parts-of-speech analysis, although attention was accorded to a number of phenomena that stand out in classical Japanese sentence structure: the distinction between sentence-final (*kire*) and continuing or modifying (*tsuzuki*), for which there were distinct inflectional forms, and the *kakari–musubi* phenomenon, a form of grammatical agreement where sets of certain modal particles require specific forms for predication.

Besides functional and positional criteria, meaning formed an important part of the *kokugaku* approach; for instance, Fujitani established inflectional endings as semantic categories, and semantic judgments were used to explain surface linguistic forms, as in Motoori Norinaga's treatment of the modal particles *wa* and *mo* as a separate group triggering predication, even though unlike his other two groups they agree with unmarked forms.

There is also the claim, as in Suzuki's work, that some aspects of language are universal but do not necessarily have representation in a particular language.

There is great attention to factual detail, but generalizations tend to be speculations on psychological processes rather than attempts to abstract rules.

There is little attempt to apply methodology from other areas of scholarship, such as the logical traditions that are found in Buddhist studies, to the study of language. This tendency, too, continues in *kokugogaku*.

3.3 *Other Work, and Two Western Interludes*

3.3.1 *Work Outside the* Kokugaku *Movement*

Other work on language took place outside the *kokugaku* movement. This included work in the Siddhaṃ tradition and in Chinese phonology, but also produced a proliferation of dictionaries on the spoken language, including the *Butsurui shōko* (1775), a dictionary of dialects by a *haiku* poet, and the unpublished *Rigen shūran*, a work on colloquial expressions and dialects by Ōta Zensai (1759–1829), a scholar of classical Chinese.

3.3.2 *An Early Portuguese Interlude*

Portuguese missionaries, who had come to Japan from the middle of the sixteenth century onward, were the first to engage in systematic study of the Japanese language. The Jesuit press in Nagasaki produced a variety of books to this end, culminating in João Rodriguez's *Arte da Lingoa de Iapam* (1604–08) and its more concise sister volume *Arte breve da lingoa Japoa* (1620). These are systematic surveys of standard colloquial Japanese modeled on Latin grammars, with attention to features such as honorifics and regional varieties; however, these works were written in Portuguese and had no discernible influence on language studies by Japanese (Christianity and western books were proscribed in 1614). They did, however, influence western scholars of the Japanese language, such as J. J. Hoffmann (*Japansche spraakleer* 1868), who in turn influenced western scholars working in Japan, such as Aston and Chamberlain (see Sect. 4.1).

3.3.3 *The Dutch Interlude*

During the period of national seclusion (1639–1854), the Dutch were the only Westerners who were allowed to maintain a small trading post off Nagasaki, from where a tradition of Dutch studies developed in Japan, initially through the hereditary Japanese interpreters.

Fujibayashi Fuzan's *Waran gohōge* (1815), the first Dutch grammar to appear in printed form, introduced European parts of speech to Japan, including items quite alien to Japanese such as the article, and Tsurumine Shigenobu's *Gogaku Shinsho* (1833) applied Dutch concepts of case and tense to Japanese.

From the mid-nineteenth century, Dutch studies began to be replaced by the study of other European languages, through which European linguistics began to be absorbed from about the 1880s.

4. The Modern Period

4.1 *Beginnings, and the Comparative Method*

In 1886, a department of linguistics was established at Tokyo Imperial University, initially largely staffed by foreigners, who were hired to train a generation of Japanese scholars. B. H. Chamberlain, an Englishman whose work includes a comparative study linking Okinawan with Japanese, lectured there on linguistics and Japanese from 1886–90, and produced many students who were to be major players in the development of Western linguistics as well as *kokugogaku*. One of them was Kazutoshi Ueda (1867–1937), who is sometimes claimed as the father of both Japanese linguistics and the *kokugogaku* school of Japanese language studies. Having studied in Leipzig from 1890–94, he brought the comparative method to Japan and established the long-lasting popularity of Hermann Paul's *Prinzipien* in Japan through his lectures.

Chamberlain and the resident British diplomat W. G. Aston had made some use of the comparative method in their work on the genetic relationship of Japanese, but it was not until Shirō Hattori (1908–95) that the comparative method was applied in Japan in the early 1930s in his work on the pitch accent of the eastern and western groups of Japanese dialects. Hattori, a structuralist, is one of a number of trained linguists who contributed to *kokugogaku* in various ways; but the genetic relationship between these major dialect groups is in the early 1990s still an unresolved issue in Japan (see Ramsey (1982) for details and an assessment of *kokugogaku* research attitudes).

4.2 Kokugogaku Grammars

After a number of attempts at describing Japanese grammar largely on the European model, culminating in Ōtsuki Fumihiko's *Kōnihon bunten* (1897), Yoshio Yamada (1873–1958) was the first major modern grammarian to propose a system of its own for Japanese.

Yamada established his system, which remains the basis for *kokugogaku* grammatical research, in his *Nihon bunpōron* (Japanese Grammar, 1902–08); he subsequently developed, applied, and modified his ideas in an impressive series of grammatical works over the next half century.

Nihon bunpōron starts out with an examination of the history of grammatical studies, especially the parts of speech, in Japan, and goes on to argue that foreign grammatical systems (as applied to Japanese by some earlier scholars) are ill-suited for Japanese. In this sense, Yamada can be placed in the tradition of Early Modern scholars such as Fujitani Nariakira, whom he rated highly, but he reinterpreted and systematized their work in the light of the work of European linguists such as Sweet and Heyse, and the experimental psychologist Wundt.

For instance, his parts of speech theory, which is similar to Early Modern analyses such as Fujitani's and Suzuki's in that it distinguishes concept words and relation words, differs radically in that he assigns items such as verbal/adjectival inflectional endings and suffixes as well as conjunctions, which the earlier grammarians had treated consistently as relational, to the conceptual category.

Yamada's most lasting influence in Japan is his predication theory (*chinjutsuron*), a mentalistic attempt to capture sentence formation in Japanese. Yamada holds that sentences are formed by 'apperception,' a unification in the mind of its individual components such as words, and argues that this unification is expressed in language by predication.

Apart from his works on grammatical theory, which include *Nihon bunpō kōgi* (Lectures on Japanese Grammar, 1922), *Nihon bunpōgaku gairon* (An Outline of Japanese Grammar, 1936), and *Nihon kōgohō kōgi* (Lectures on Japanese Colloquial Grammar, 1922), he produced a series of historical grammars for periods of Japanese language history, which are still regarded as standard works. He also opened up new areas of research through his work on honorifics and the language of Japanese glosses of Classical Chinese.

Like Yamada, Tokieda drew renewed attention to traditional Japanese linguistic thought as the ideal vehicle for dealing with the Japanese language. In contrast, Mikami Akira (1903–71) was a scholar who argued against the uncritical application of Western linguistics based on his analysis of modern Japanese. Rejecting the Indo-European subject–predicate matrix as unsuitable for Japanese, he devoted a series of works to demonstrating the advantages of a topic-comment approach, such as *Gendai gohō josetsu* (1953).

Motoki Tokieda (1900–67) was one of the most controversial of Japanese grammarians of the *kokugogaku* school. He made a big impact between the 1930s and 1950s because of his speculative and psychological approach, breathing fresh life into the *kokugogaku* school, which was being stifled by its overly descriptive and formalistic approach. A product of Tokyo Imperial University, he graduated with a dissertation on the language consciousness of Early Modern Japanese scholars (the National Learning or *kokugaku* school), and in his *magnum opus Kokugogaku genron* (*Fundamental treatise on the national language*, 1941) established his theory of language as a psychological communicative process (*gengo kateisetsu*) in opposition to structuralist writings in Japan and elsewhere, notably Saussure's prescriptive concept of *langue* in his *Cours de linguistique générale*.

Tokieda was strongly influenced by Suzuki Akira's approach to Japanese parts of speech analysis with its distinction between concept words ('the tools') and relational elements ('the hand that operates them'). Tokieda extends this way of thinking into words that undergo the conceptualization process (*shi*) and those that do not (*ji*). The most typical of the latter category are interjections, but many other grammatical morphemes are included. However, he retreats a step from Suzuki's position in that he excludes adverbs (which in Japanese tend to agree with a following verbal/adjectival suffix), and his position is unclear on inflectional endings.

Tokieda developed this basic distinction further in claiming that *shi* operate on different levels: '*shi* always express the objective world, whereas *ji* express the feelings, emotions, will and desires etc. which the language user directs towards the objective world.' He goes on to say that the basic *shi*/*ji* distinction, which is found in traditional Japanese scholarship since the thirteenth century, is encoded in the Japanese language in such a way as to make it particularly noticeable, being often expressed as a combination of two items, e.g., noun plus particle, whereas the division between the two categories is much less obvious in fusional languages such as Latin. However, the distinction between the two categories itself is claimed to be universal.

4.3 Dialect Geography and Other Western Influences

Ueda may also be said to be the father of modern dialectology in Japan; under his chairmanship, the Investigative Committee of the National Language carried out a nationwide investigation into the vocabulary, grammar, and phonology of Japanese dialects in the early years of the twentieth century, under influence from Wenker's dialect geography. Dialect geography has been widely practiced in Japan since the 1950s, influenced by Father Willem Grootaers's work there, culminating in the monumental *Nihon gengo chizu* ('Linguistic Atlas of Japan') published from 1967–75 by the Dialect Bureau of the National Language Research Institute.

Phonetics and phonology is another area that has absorbed much influence from the West, initially from the Prague school, later from American phonemics.

Especially since World War II, Western influences have been strong in linguistics and foreign language university departments all over Japan, many having become staffed by Japanese returning from study overseas, especially in the U.S.A., armed with the latest methodology.

Bibliography

Bedell G D 1968 *Kokugaku* grammatical theory (Doctoral dissertation, Massachusetts Institute of Technology)

Doi T 1976 *The Study of Language in Japan: A Historical Survey*. Shinozaki Shorin, Tokyo

Grootaers W A 1967 Dialectology. In: Sebeok T A (ed.) 1967

Hattori S 1967 Descriptive linguistics in Japan. In: Sebeok T A (ed.) 1967, pp. 530–84

Kaiser S (ed.) 1995 *The Western Rediscovery of the Japanese Language*. 8 vols. Curzon Press, London.

McEwan J R 1949 Motoori [Norinaga]'s view of phonetics and linguistics in his Mojigoe no kanazukai and Kanji san on kō. *Asia Major*, New Series **1**: 109–18.

Ramsey S R 1982 Language change in Japan and the Odyssey of a *Teisetsu. The Journal of Japanese Studies* **8(1)**: 97–131

Sebeok T A (ed.) 1967 *Current Trends in Linguistics. Vol. 2: Linguistics in East Asia and South East Asia. Part 1: Linguistics in East Asia.* Mouton, The Hague

Shibatani M 1978 Mikami Akira and the notion of 'subject' in Japanese grammar. In: Hinds J, Howard I (eds.) *Problems in Japanese Syntax and Semantics*. Kaitakusha, Tokyo

Wenck G 1957 Japanese language studies since Chamberlain. *The Transactions of the Asiatic Society of Japan*, 3rd series **5**: 36–55

Yanada S 1950 Motoori Norinaga's contributions to a scheme of Japanese grammar. *Bulletin of the School of Oriental and African Studies* **13**: 474–503

History of East Asian Phonetics

Edwin G. Pulleyblank

1. China

The study of speech sounds emerged much later in China than in either Greece or India, and when it did appear it was greatly influenced by elements of Indian phonetic science that came to China along with the Indian religion of Buddhism. The problem of representing the sounds of words as distinct from their conventional graphs arose in the Han period (206 BC–220 AD) in commentaries on the classics. At first the only way of doing this was to give an exact or near homophone, sometimes with an impressionistic description of the difference in pronunciation. The solution that eventually emerged was to spell one monosyllable by means of two other monosyllables, of which the first had the same initial sound and the second the same rhyming part or 'final.' Thus, *dōng* 'east' could be spelled as *dé* 'get' + *gōng* 'public.' The process was called *fǎn* 'turning' (from the character representing the initial to that representing the final) or *qiè* 'cutting,' later combined into the disyllabic expression *fǎnqiè*. This method originated about the time when Buddhism was first becoming known in China and there has been much controversy as to whether it reflects Indian influence. There does not, however, seem to be any close model for it in Indian phonetic theory and dividing a phenomenon into a pair of complementary parts is very much in keeping with traditional Chinese modes of analysis. The invention of the *fǎnqiè* method eventually led to the compilation of dictionaries in which words were classified first by their rhyming parts and then, within each rhyme, into homophone sets that shared the same nonrhyming part.

Whether or not it was responsible for the *fǎnqiè* method, the coming of Buddhism undoubtedly stimulated interest in the analysis of speech sounds which bore fruit in the first significant phonetic discovery of the Chinese about their own language: the recognition and naming of the Four Tones. This is traditionally associated with the name of Shen Yue (441–513), a poet and historian who lived at Jiankang (known in the late twentieth century as Nanjing), the capital of the Southern Dynasties. Shen and his literary circle developed theories of tonal prosody that became very influential. What the so-called 'tones' (the Chinese word is *shēng*, which simply means 'sound') were like at this period is difficult to determine. They were named *píng* (Level), *shǎng* (Rising), *qù* (Departing), and *rù* (Entering). Level and Rising seem to refer to pitch but there is also evidence suggesting that the Rising Tone ended in a glottal stop. The difference between Level and Rising Tones was used to distinguish long and short vowels when transcribing Sanskrit, suggesting that the Rising Tone was cut off sharply. Syllables in the so-called 'Entering Tone' were characterized, not by a distinctive pitch contour, but by ending in a stop consonant. The Departing Tone originated, at least in part, from an *-*s* suffix and there is reason to believe that a sibilant ending still survived in certain finals at the end of the fifth century, while in other finals it had been replaced by a feature of aspiration. If so, the contrast between final friction and final stop closure may have been what led to these 'tones' being labeled contrastively as 'Departing' and 'Entering.' An important dichotomous distinction among the four tones in tonal prosody was between Level and Deflected (i.e., any of the other three tones). This development was probably inspired by Sanskrit meters based on alternations of long and short syllables as found in Buddhist chanting (Mair & Mei 1991).

While the naming of the tones and their incorporation into theories of prosody was the work of Chinese literary scholars, it was the Chinese Buddhists' knowledge of the Indian alphabet, with its mystical significance from a religious point of view, that led to a more comprehensive analysis of Chinese speech sounds. This culminated in the invention of the so-called 'Rhyme Tables,' designed to present all the syllables of the language on a rectangular grid. Words with the same initial formed vertical columns from right to left, while words with the same final were ranged in horizontal rows below. The earliest extant rhyme table, the *Yùnjìng* (Mirror of Rhymes), is known only in editions of the Southern Song period (twelfth–thirteenth century) but manuscript fragments and internal evidence show that it must go back to a much earlier original. Other tables, arranged somewhat differently, are known from both Northern and Southern Song. Misunderstanding has arisen from the fact that, although these rhyme tables present themselves as keys to the prestigious *Qièyùn* rhyme dictionary of 601 which codified Early Middle Chinese (EMC)—a pre-Tang standard language that had prevailed in both north and south China from the fourth to sixth centuries—the language analyzed in the tables is actually Late Middle Chinese (LMC), a more recent standard based on the Tang capital, Chang'an. Yet, although the Tang standard had lost many of the distinctions of the *Qièyùn*, the two languages had a common ancestor and it was possible to match their phonological categories. To accomplish this task and present the distinct syllables of the *Qièyùn* in terms of categories derived from analysis of the contemporary language was a considerable intellectual achievement. Later tradition associated it especially with the name of Shouwen, a monk who may have lived in the ninth century.

A list of 30 initials, later enlarged to 36, was established, each named by a word that exemplified it, e.g., *jiàn* (LMC kjian) 'see' for [k]. The 36 initials were classified into five sets:

(a) Lip Sounds, subdivided into Heavy (bilabials), p, p^h, pɦ, m, and Light (labiodentals), f, f^h (artificially distinguished from f, to provide room in the tables for words with initial p^h in the *Qièyùn* that had undergone labiodentalization in LMC), fɦ, *ʋ*;
(b) Tongue Sounds, subdivided into Tongue-Head (alveolar), t, t^h, tɦ, n, and Tongue-Up (retroflex), tɹ, tɹ^h, tɹɦ, nɹ;
(c) Molar or Back-Tooth Sounds (velar), k, k^h, kɦ, ŋ;
(d) Incisor or Front-Tooth Sounds (sibilants), subdivided into Front-Tooth-Head (alveolar), ts, ts^h, tsɦ, s, sɦ, and True-Front-Tooth (retroflex), tʂ, tʂ^h, tʂ, ʂ, ʂɦ:
(e) Throat Sounds (laryngeals and velar fricatives), ˀ, x, xɦ, H (standing for smooth voiced onset).

The liquids, l and ɹ, labeled Half-Tongue and Half-Front-Tooth respectively, were placed separately at the end of the list. The presentation is clearly inspired by the five vargas of traditional Indian alphabets adapted to Chinese phonology. The names did not have the anatomical precision found in Indian phonetic treatises but were simply labels to identify classes of sounds. The term 'Back-Tooth Sounds' may reflect the fact that the edges of the tongue make contact with the back teeth when articulating velar stops. The term 'Front-Tooth Sounds' for alveolar sibilants can be compared to 'dental,' used broadly for sounds with a dental or alveolar place of articulation, while the term 'Tongue Sounds' for the corresponding stops uses the articulator instead as the label. The manner distinction between stop and affricate or fricative is left unspecified. The term 'True-Front-Tooth Sounds' applied to the retroflex sibilants probably derives from the fact that the word *chǐ* 'front teeth' began with a retroflex affricate and so exemplified the kind of sound it named. The treatment of retroflex sounds as a subcategory of alveolars instead of setting up separate vargas as the Indian models might have suggested can be explained from the fact that the two consonant types were historically related to one another and in partial complementary distribution in respect to the finals with which they could be combined.

Within the five vargas, initials were classified in terms of phonation by the terms 'Clear' (plain voiceless stop or fricative), 'Second Clear' (voiceless aspirate), 'Muddy' (voiced aspirate, transcribed as pɦ, fɦ, tɦ, etc., in the above list, that is, with voiceless onset and voiced aspirate release as in modern Wu dialects), and 'Clear-Muddy' (sonorant, including voiced continuants as well as nasals). Clear and Muddy are commonly interpreted as 'voiceless' and 'voiced,' but this will not account for the term 'Clear-Muddy' applied to nasals and liquids which were certainly voiced sounds. An alternative term found in one of the earliest lists of the 36 initials is 'Not-Clear-Not-Muddy.' Later, the term 'Second Muddy' was applied in imitation of Second Clear. Muddy may have had an impressionistic reference to breathy voice, but the opposition Clear/Muddy was borrowed from ancient Chinese musical theory where it referred to relatively high and low pitch. Its application to the initial consonants in the rhyme tables probably reflects the still redundant register split in the Middle Chinese tones, conditioned by voiced aspiration, that took place during the Tang period. Sonorants formed an intermediate class of initials in terms of their effect on tone, sometimes behaving like the voiced aspirates and sometimes like the voiceless stops and fricatives. The term Second Clear must be a calque on Sanskrit *dvitīya* 'second' used to label the voiceless aspirates in that language.

The finals in the rhyme tables were arranged in 16 *shè*, literally 'gathering' or 'cluster,' corresponding to the actual rhyming categories of poets using the vernacular language in the ninth century. Each of these rhyme groups was labeled either 'Inner Turning' (*nèi zhuǎn*) or 'Outer Turning' (*wài zhuǎn*). Though there is some confusion in the application of these terms in the various rhyme tables, probably due to changes in the language between Tang and Song that obscured the distinction, it seems clear that, originally, Inner finals with non-low vowels (ə, i, u, y) and the same final consonant or glide, which could all rhyme together, were contrasted with Outer finals with low vowels or diphthongs ending in a low vowel (a, aa, ia, ua, ya) and the same final consonant or glide, which could also all rhyme together in the usage of the time. Within each *shè*, tables were labeled 'Open Mouth' (*kāikǒu*) or 'Closed Mouth' (*hékǒu*), depending on whether or not there was a rounded vowel or glide immediately following the initial, e.g., *kan* versus *kuan*.

Each table had sixteen rows, four rows for each of the four tonal categories, Level, Rising, Departing, and Entering. As in the *Qièyùn*, Entering Tone words were associated with corresponding nasal finals, -p with -m, -t with -n, -k with -ŋ. The four rows within each tonal category were called 'Grades' (*děng*). It is obvious from the modern reflexes that these Grades referred to palatalization, but how to define four 'grades' of palatalization has long been a puzzle. According to the theory presented in Pulleyblank (1984: 73 ff.) Grades III and IV together differed from Grades I and II in having the front vowels, [i] (Open Mouth) or [y] (Closed Mouth), either alone or as the first element in the diphthongs, [ia], [ya]. The further differentiation between Grades I and II, and between Grades III and IV, depended on the type of initial. In the case of velars with Open-Mouth finals, which provided the basic framework, the initial was followed by a palatal glide in Grades II and IV, e.g., Grade I *kan*, Grade II *kjaan*, Grade III *kian*, Grade IV *kjian*. The distinction between long –aa- in Grade II and short –a- in Grade I was not given explicit recognition in the tables but can be reconstructed from other evidence. In the corresponding Closed-Mouth finals—Grade I *kuan*, Grade II *kwaan*, Grade III *kyan*, Grade IV *kjyan*—there is no palatal glide in Grade II but instead a labial glide before the long vowel in contrast to syllabic –u- before the short vowel in Grade I. A noteworthy feature of the whole system of sound classification in the rhyme tables is the extent to which it proceeds by means of successive binary splits.

From the Song period (tenth to thirteenth centuries) onward the Buddhist rhyme table tradition became assimilated into secular linguistic scholarship, and in later times provided a model for the analysis of new contemporary forms of the language. An important figure in this regard is Pan Lěi (1646–1708). By his time the fourfold distinction in degrees of palatalization had long become obsolete. In the new style rhyme table which he devised for current Mandarin, he distinguished four syllable types in terms of the presence or absence of a high vowel or glide following the initial: *kāikǒuhū* 'open-mouth' (no high vowel/glide), *hékǒuhū* (back-rounded vowel/glide), *qíchǐ* 'even-teeth' (front-unrounded vowel/glide), *cuōkǒuhū* 'pursed mouth' (front-rounded vowel/glide). These terms are obviously based on observation of the shape of the lips as viewed from the front. 'Even-teeth' refers to the mouth with spread lips for the vowel [i], while 'pursed mouth' as opposed to 'closed mouth' refers to the tenser rounding of the lips for the vowel [y] than for [u]. This four-way distinction is still in use, for example, in the *zhùyīn zìmǔ*, a native system of phonetic symbols devised for Chinese in the twentieth century.

2. Korea

Writing first came to the Korean peninsula in the form of written Chinese, which remained dominant for most purposes among the educated elite down to the twentieth century. From the beginning, Chinese characters were sometimes used phonetically to record

Korean proper names and there were even collections of vernacular poetry (now unfortunately mostly lost) transcribed through the medium of Chinese characters. In bureaucratic practice a form of writing known as *idu* developed, in which the word order wavers between Chinese and Korean and characters used phonetically are inserted as grammatical markers to assist the Korean reader. The remarkable *han'gŭl* alphabet that has now come into its own, replacing Chinese characters completely in North Korea, and to a large extent in South Korea also, was invented as part of an ambitious program of language reform instituted by King Sejong (reigned 1419–50). It encountered implacable resistance from conservative bureaucrats and only survived at all because it was taken up by the Buddhists, who were despised by the dominant Confucian elite, and because it was found useful for pedagogical purposes, especially for making sound glosses on the classics and for teaching colloquial Chinese, which was important for diplomatic communications. Sejong's own intention, however, was to use the alphabet as a means of promoting literacy in both Chinese and Korean among the common people. Sejong was a man of scholarly attainments, thoroughly conversant with traditional Chinese linguistic theory, and though he was no doubt assisted by members of his academy, the Hall of Assembled Worthies, his claim when he first promulgated the alphabet at the end of the lunar year corresponding to 1443 that it was his personal invention is very likely correct. In addition to traditional Chinese rhyme table phonology, the ḫP'ags-pa orthography for Chinese, an adaptation of the Tibetan alphabet introduced in the period of Mongol domination and also known in Korea, probably had some influence on Sejong's invention, for example, in suggesting the use of the same signs for final as well as initial consonants (see Fig. 1).

Sejong's alphabet consists of 17 consonant signs and 11 vowel signs, 28 letters in all. Two of the consonant signs (ʔ and z) and one of the vowel signs (ə) have since become obsolete. The arrangement of the consonants and the terms used to classify them were borrowed from the Chinese rhyme table tradition. Within each class the terms 'Clear' and 'Second Clear' were applied to plain voiceless and voiceless aspirates, as in Chinese. Korean did not then, and does not now, have voiced obstruent phonemes and the voiced aspirates of Late Middle Chinese had already disappeared in northern Chinese in the fifteenth century, so no separate letter forms were created for them. The term 'Muddy' was instead applied to signs formed by doubling the letters for plain voiceless consonants. In the modern language, these doubled letters are used for a third class, voiceless obstruents, characterized by glottal tension, most of which are derived from clusters of *s*+an obstruent in Middle Korean. There are, however, other origins, especially from certain kinds of Sandhi, and it is quite likely that they already constituted a recognizable phonetic type, interpreted as geminates by native speakers of Sejong's day, even if they were not yet independent phonemes at the time the script was invented. Their main function in Sejong's alphabet, however, was to provide an artificial means to represent the historic Chinese 'Muddy' initials of the rhyme tables.

Consonants

	clear	second clear	muddy	not-clear-not-muddy	clear	muddy
molar	k ㄱ	kʰ ㅋ	kk ㄲ	ŋ ㆁ		
lingual	t ㄷ	tʰ ㅌ	tt ㄸ	n ㄴ		
labial	p ㅂ	pʰ ㅍ	pp ㅃ	m ㅁ		
incisor	c ㅈ	cʰ ㅊ	cc ㅉ		s ㅅ	ss ㅆ
guttural	? ㆆ	h ㅎ	hh ㆅ	H ㅇ		
half-lingual				l ㄹ		
half-incisor				z ㅿ		

Vowels

yang				yin				neutral	
ɔ(>a/ɯ)	ㆍ			i(>ɯ)	ㅡ			ji(>i)	ㅣ
a	ㅏ	ja	ㅑ	e(>ʌ)	ㅓ	je(>jʌ)	ㅕ		
o	ㅗ	jo	ㅛ	y(>u)	ㅜ	jy(>ju)	ㅠ		

Figure 1.

The shapes of the consonant signs in each row are related to one another. Sejong's *Correct Sounds for the Instruction of the People*, in which he described his invention, explains that the simplest sign for each type of consonant is intended as a graphic representation of how the articulation of the sound is made. Thus, *k* is said to depict the root of the tongue blocking the throat. Since k^h is 'a little more severe' than *k*, a stroke is added. In the case of the Linguals, *n* is the basic letter, said to depict the 'tongue touching the upper palate.' Strokes are added successively to make *t* and t^h. The square for *m* is like the Chinese character for 'mouth' and so represents the lips. The way in which the strokes are added to make *p* and p^h is less straightforward but there is still a clear relation. The simplest of the Incisor initials, *s*, is said to depict a tooth and this, by the addition of strokes, gives *c* and c^h. The 'half lingual' and 'half incisor' initials, *l* and *z*, were also related to the signs for *n* and *s* respectively, though it was noted that the principle of adding strokes to correspond to greater 'severity' in articulation did not apply. The sign transcribed as *z* was primarily used to represent the retroflex *r* of Chinese. It was also sometimes used for the voiced intervocalic allophone of *s* in native Korean words but this practice soon died out and the letter became obsolete.

The circle for the 'zero initial,' transcribed as H in Fig. 1 is said to depict the opening of the throat. This letter is still used for vowel initial syllables in Modern Korean. Though from one point of view it can be looked on as just a relic of the Chinese rhyme tables, which had a column for smooth vowel onset alongside those for the other consonantal initials, there is reason to think that, in Middle Korean, as in Middle and Modern Chinese, this 'zero consonant' may have actually been a weak, scarcely audible, velar or pharyngeal glide (Ledyard 1966: 172). With one stroke added, the same sign stood for glottal stop. This was a purely theoretical construct to match the Chinese rhyme tables and was never used in native Korean words. Even in the Early Mandarin of the fifteenth century, the old initial glottal stop was no longer distinctive and the use of this letter for transcribing Chinese, which soon died out, was quite artificial. With two strokes added, the circle for the 'throat' gave the letter for the 'guttural' fricative, velar [x] in Chinese, laryngeal [h] in Korean. A slightly puzzling feature of the consonantal signs is that the velar nasal, [ŋ], though classed as a 'molar' consonant, was represented by a letter derived from the 'throat' symbol. This is probably because, though [ŋ] occurs finally in both Korean and Chinese and is a distinct initial in the rhyme tables, it is not an initial consonant in Korean and even in Early Mandarin it was only found in this position as a variant of 'zero.' In modern usage, because of their complementary distribution, the sign for final [ŋ] is no longer distinguished from the zero initial and the 'throat' circle is used for both without modification. Another use of the 'throat' symbol was as a diacritic added to the letters for labial consonants to distinguish the Chinese 'light labials,' i.e., the labiodentals, which did not exist in Korean. This usage may have been suggested by ḥP'ags-pa, which has *hw* for Chinese [f]. The combination *pH* was sometimes used in Middle Korean to represent the intervocalic allophone [b] of Korean *p*, and *mH* was used to represent final *–w* in the artificial 'reformed' spelling of Sino-Korean, but otherwise these letters soon became obsolete.

Apart from the analytical and iconic structure of the consonant letters, the most original and interesting feature of Sejong's alphabet is undoubtedly the treatment of the vowels. For this he had no precedent in either the Chinese rhyme table phonology, which incorporated vocalic distinctions in the classification of rhymes, or the ḥP'ags-pa alphabet, which treated them, on the Indian model, as modifications of an [a] vowel inherent in the preceding consonant. Sejong took over the principle of dividing speech into syllables from his models, but he analyzed each syllable as having three parts, a beginning (consonant), a middle (vowel), and a final (consonant). The Middle Korean values given for the 11 primary vowel signs in the above table are partly hypothetical reconstruction, based on comparison of Sino-Korean with Late Middle Chinese and on analysis of the system of vowel harmony which was almost certainly originally of Altaic type, based on a front/back, palatal/nonpalatal contrast. The two harmonic sets of vowels were explicitly recognized by Sejong, who called them '*yang*' and '*yin*' respectively, using the names of the positive and negative, or male and female, principles of Chinese cosmogonic theory. The vowels [ə], [a], and [o] were *yang*; [i], [e], and [y] were *yin*. As shown by the values in parentheses, in Modern Korean all the *yin* vowels have become retracted and lost their palatality—[i] > [ɯ], [e] > [ʌ], [y] > [u]—while new front vowels have replaced them derived from monophthongization of earlier diphthongs—[ji] > [i], [ej] > [e], [aj, əj] > [æ], [oj] > [ø], [yj] > [y]. In the process the *yang* vowel, [ə], has disappeared as an independent phoneme, merging partly with [a] and partly with [ɯ]. It is difficult to tell just how far these changes had already gone in the fifteenth century, but the alphabet tells us that [ə] was still a distinct vowel and that the diphthongs in -j had not yet simplified. Sejong's incorporation of separate letters for [ja], [je], [jo], [jy], in his alphabet, instead of writing them as combinations of [j(i)] with the letters [a] [e] [o] [y], like the diphthongs [aj], etc., may seem strange from a modern standpoint. It was probably because [ji] corresponded to both [j] + [i] and [j] + [ə] and hence was neutral in terms of vowel harmony. Though Sino-Korean clearly shows that in the ninth century [ji] bore the same relation to [i] as [je] to [e] and [jy] to [y], it is quite likely that in the fifteenth century [ji] had already simplified to [i] and original [i] had lowered and centralized somewhat, perhaps to [ɪ], even if it had not yet reached its modern value [ɯ].

The shapes of the vowel letters are related to the *yin–yang* concept. The basic *yang* vowel [ə] is a small filled-in circle representing Heaven. The basic *yin* vowel [i] is a horizontal line representing Earth, while the neutral vowel [ji] is a vertical line representing Man, the intermediate principle that links them together. The other vowel signs are combinations of these three primary signs. The justification in cosmological terms need not concern us. The explanation in terms of articulation, though schematic and imprecise, is however of interest. For the first vowel [ə], the tongue is said to 'retract' and the sound is described as 'deep.' For the second primary vowel, the tongue is said to retract a little and the sound is described as neither deep nor shallow, which seems to fit [ɪ] better than [i]. For the third primary vowel, the tongue does not retract and the sound is shallow, presumably a description of high front [i]. The *yang* vowels [o] and [a] are both said to derive from [ə], the one by contraction of the mouth (presumably referring to rounding of the lips), the other by spreading (opening?) of the mouth. The same two terms, 'contracting' and 'spreading,' are used to derive [y] and [e] respectively from the primary *yin* vowel [i]. Contraction can again be straightforwardly interpreted as lip rounding, while spreading may again refer to lowering of the jaw (as an accompaniment of lowering the tongue).

Another feature of Sejong's alphabet that made it a remarkably complete alphabetic notation for both Chinese and Middle Korean was the provision of tone marks. For Chinese, Level Tone was unmarked, Departing Tone was marked by a single dot placed at the left of the syllable, and Rising Tone by two dots in this position. Entering Tone was also unmarked since it was implied by the presence of -p, -l, or -k as a syllable closure. The same marks were applied to native Korean words and this has led to the discovery of a system of pitch accent in Middle Korean, comparable to that of Japanese, that has since been lost in the modern standard language, though similar systems are still found in some southern dialects. It would appear that the Middle Korean Level Tone was low, the Departing Tone was high, and the Rising Tone was a combination of Level and Departing, beginning low and ending high. Rising Tone syllables were bimoraic, derived either from combinations of stems with suffixes or contraction of disyllabic stems. Though the pitch contour has been lost in the modern language, the bimoraic structure survives as vowel length (Ledyard 1966: 205–12).

3. Japan

There was much interest in Japan in premodern times, both in the study of the Sanskrit alphabet and in Chinese rhyme table phonology as applied to Sino-Japanese (see also *Linguistic Thought in Japan*). Visiting Japanese monks made valuable observations on the values of the Chinese tones in late Tang times (ninth century) and it is worth noting that the earliest surviving rhyme table, the *Yùnjìng*, is available only because it was preserved in Japan after it had been lost in China. In contrast to Korea, however, there was comparatively little application of such phonetic studies to the Japanese language itself. The two *kana* syllabaries that were devised to write Japanese both developed from the use of Chinese characters to transcribe Japanese phonetically. *Hiragana* was a conventionalized selection of cursive forms of whole characters, while the 'square' *katakana* were created by taking parts of more formally written characters to stand for the whole. Linguistic analysis entered the picture when the conventional arrangement of the *kana* known as the *gojūon*, 'fifty sounds,' was devised. This consists of a table with 10 rows and 5 columns. The first row consists of the 5 vowels *a*, *i*, *u*, *e*, *o*. The remaining rows present the same 5 vowels preceded by *k*, *s*, *t*, *n*, *h*, *m*, *y*, *r*, *w* in that order. There are gaps in the table for *yi*, *ye*, and *wu*, which do not occur, and a *kana* sign for syllable final *n*, which constitutes a separate *mora* according to the rules of Japanese prosody, so that the table actually contains 48 signs rather than 50. The arrangement of the table is clearly based on an Indian model. The order of the vowels is that of Sanskrit. *S*- takes the place of palatal *c*-, while *h*-, which was probably a bilabial fricative [ɸ] in Old Japanese, if not actually [p], takes the place of *p*-. *N*- and *m*- follow the corresponding stops, while the continuants *y*-, *r*-, *w*- end the table in the same order that they appear in Indian alphabets. A noteworthy feature of the *kana* syllabaries is that they do not provide separate letters for syllables with voiced obstruents, *ga*, *za*, *da*, *ba*, etc. These sounds do not occur as initials in native Japanese words and their occurrence intervocalically, while distinctive, is subject to special phonological rules. Instead of having 20 separate signs to denote them, the device was eventually adopted of placing two dots, called '*nigoriten*' or '*dakuten*,' at the upper right-hand corner of the sign, *nigori* being the native Japanese equivalent and *daku* being the Sino-Japanese reading of Chinese *zhuó* 'muddy.' Another device borrowed from Sino-Japanese in order to adapt the *kana* syllabaries to Japanese phonology is the use of the graph for *tsu* as a mark of the gemination of a following consonant. Because Japanese words cannot end in a stop consonant, Middle Chinese Entering Tone syllables ending in *-p*, *-t*, *-k* had to be supplied with an extra parasitic *-i* or *-u* vowel when they were borrowed into Japanese, e.g., *fuku* 'again' < fɦuwk, *hatsu* 'send out' < faat, *gō* (spelled ga-fu) 'join' < xɦap. When such a word is followed in a compound by a Sino-Japanese word beginning with the same initial consonant, the parasitic vowel is dropped and its onset forms a geminate with the onset of the following syllable, e.g., *gappei* 'combination,' *hattatsu* 'advance, progress,' *fukkatsu* 'revival.' In the case of final *-tsu*, there is assimilation to any following voiceless initial, e.g., *hakkō* 'publish,' *hassei* 'utterance,' *happyō* 'announcement,' which no doubt suggested its use as a general mark of gemination that could also be extended to native Japanese words.

Bibliography

Downer G B 1963 Traditional Chinese phonology. *Transactions of the Philological Society*: 127–42

Ledyard G K 1966 The Korean language reform of 1446: The origin, background and early history of the Korean alphabet. PhD Dissertation, University of California, Berkeley, California

Mair V H, Mei T 1991 The Sanskrit origins of Recent Style prosody. *Harvard Journal of Asiatic Studies* **51**: 375–470

Pulleyblank E G 1984 *Middle Chinese: A Study in Historical Phonology*. University of British Columbia Press, Vancouver

SECTION IV

Antiquity — India

SECTION IV

Antiquity — India

Pāṇinian Linguistics

Paul Kiparsky

1. Pāṇini's Grammar

Pāṇini's grammar (ca.350 BC) seeks to provide a complete, maximally concise, and theoretically consistent analysis of Sanskrit grammatical structure. It is the foundation of all traditional and modern analyses of Sanskrit, as well as having great historical and theoretical interest in its own right. Western grammatical theory has been influenced by it at every stage of its development for the last two centuries. The early nineteenth-century comparativists learned from it the principles of morphological analysis. Bloomfield modeled both his classic Algonquian grammars and the logical-positivist axiomatization of his *Postulates* on it. Modern linguistics acknowledges it as the most complete generative grammar of any language yet written, and continues to adopt technical ideas from it.

The grammar is based on the spoken language (*bhāṣā*) of Pāṇini's time, and also gives rules on Vedic usage and on regional variants. Its optional rules distinguish between preferable and marginal forms, and a few rules even have sociolinguistic conditions. It is entirely synchronic: variants are simply treated as alternate forms, indeed, the very concept of linguistic change is foreign to the tradition. The grammar consists of four components:

(a) *Aṣṭādhyāyī*: a system of about 4000 grammatical rules;
(b) *Sivasūtras*: the inventory of phonological segments, partitioned by markers (*anubandhas*) to allow abbreviations for classes of segments to be formed by a technique described below (*pratyāhāras*);
(c) *Dhātupāṭha*: a list of about 2000 verbal roots, with subclassification and diacritic markers encoding their morphological and syntactic properties;
(d) *Gaṇapāṭha*: an inventory of classes of lexical items idiosyncratically subject to various rules.

The rules of the *Aṣṭādhyāyī* make reference to classes defined on the elements in the other three components by means of conventions spelled out in the *Aṣṭādhyāyī* itself. Thus, while none of the components is intelligible in isolation, together they constitute a complete integrated system of grammar.

There are also various peripheral adjuncts to the system. The most important of these are the *Uṇādisūtras*, which extend the Pāṇinian technique to analyze unproductive and irregularly formed derivatives from roots. Though mentioned in a few rules of the *Aṣṭādhyāyī*, many of the words they derive are treated as underived there, and they are probably post-Pāṇinian at least in their present form.

2. The Indian Grammatical Tradition

The science of language in India probably has its ultimate intellectual roots in the richly developed science of ritual (Staal 1988). The *sūtra* style of analysis and some of the technical concepts of grammatical description originated in the methods developed for codifying complex Vedic sacrifices. On a philosophical level, ritual is probably also the origin of a leading idea behind grammar as well as other disciplines such as yoga in ancient India: that human activities, even those normally carried out in an unconscious or unselfconscious way, can be analyzed by explicit rule systems, and that performing those activities in awareness of the rules that govern them brings religious merit.

The predecessors of Pāṇini's grammar and its compositional history are largely unknown. The *Aṣṭādhyāyī* itself cites a number of earlier grammarians, whose works have not survived. It has been suggested that its first redaction dealt with root derivation and inflection, and that rules for compounds and denominal (*taddhita*) formations were incorporated into it later from another source (Joshi & Roodbergen 1983). The early grammatical tradition appears to have had ties to the editorial activity which led to the standardization of Vedic texts (Bronkhorst 1981; Thieme 1935), and the technique of grammatical analysis probably evolved from related but less sophisticated methods like those used in the *Prātiśākhyas*, treatises that give the phonological rules relating the word-by-word (*padapāṭha*) version of Vedic works to their connected text (*saṃhitā*). These works share the goal of providing explicit and general rules for linguistic regularities, but they do not deal with morphology and syntax, and are confined to accounting for the data in a single Vedic text. By dealing with all levels of structure and not being bound to a particular corpus, Pāṇini's grammar attains an incomparably greater depth of analysis, and does justice to the unbounded nature of language.

The text of the *Aṣṭādhyāyī* is rather accurately preserved. It came quite early to be regarded as canonical, and probably only relatively minor changes were later made in its wording. The problems lie in its interpretation. Even though Pāṇini's grammar is a complete, self-contained system of rules, some of the principles that determine how those rules are to be applied are not stated, and must be inferred. A massive commentatorial tradition is concerned with just this. By far the most important work is Patañjali's *Mahābhāṣya*, the 'Great Commentary,' which incorporates and discusses Kātyāyana's earlier notes (*vārttikas*) on Pāṇini. It broaches topics ranging from minutiae to major philosophical questions, and attempts to remedy apparent lapses of the grammar by reinterpreting its rules, or, if that is not possible, by rephrasing them. It is one of the great works of Sanskrit literature, remarkable for its elegant dialectic structure and luminous style. Its conclusions are adopted in all later works. Pāṇini, Kātyāyana, and Patañjali are referred to as the 'three sages' (*muṇitraya*) and considered authoritative by later grammarians.

The *Kāśikā* provides an explicit rule-by-rule paraphrase of the *Aṣṭādhyāyī*, and explains the wording of each rule with appropriate examples. Its simplicity, like that of the modern translations of Pāṇini which are largely based on it, can be deceptive: the interpretation which it states apodictically for a rule may just be the tip of the *Mahābhāṣya*'s enormous iceberg of (sometimes inconclusive) argumentation about it.

The text most commonly used to teach the system in India is Bhaṭṭojī Dīkṣita's *Siddhānta-Kaumudī*, which reorganizes the rules according to grammatical topics and takes the student through Pāṇini's whole system in an orderly way. Since the rules that come into play in any particular derivation are likely to be scattered all through the *Aṣṭādhyāyī*, this reorganization is a great help to the learner. The drawback of this method is that the architecture of the system is obscured. For example, the wording of a rule must usually be completed in context from the rules preceding it according to certain conventions, but this context is lost when the rules are rearranged as in the *Siddhānta-Kaumudī*.

The standard treatise on the principles and metarules (*paribhāṣās*) of the system is the *Paribhāṣenduśekhara* of the great eighteenth-century grammarian Nāgojībhaṭṭa (a.k.a. Nāgeśa). At an even higher level of generalization, Bhartṛhari's *Vākyapadīya* deals with topics in the philosophy of language from a grammatically sophisticated point of view.

These later works in the Pāṇinian tradition make important contributions in their own right. The innovations they come up with are prompted by several circumstances: (a) careful analysis of Pāṇini's grammar reveals occasional gaps and inconsistencies in its formulations, both at a descriptive level and in matters of theory; (b) after Pāṇini's time, new words and forms not covered by his rules appeared in the Sanskrit language; (c) the original intent of some rules had been forgotten because of discontinuities in the early grammatical tradition. Increasingly reluctant to tampe with the wording of the rules, grammarians afte Pāṇini prefer to fix the problems by devising ingenious reinterpretations. These reinterpretations, while extending the coverage of the grammar in the intended ways, can also cause considerable overgeneration, and sometimes obscure the original rigorous simplicity and beauty of the *Aṣṭādhyāyī*. One of the urgent tasks of Pāṇini research is to reconstruct the original design of the system and the evolution of the interpretive apparatus later built on top of it. This can be done by a combination of philological and analytic research. It is often possible to recover the intent of a doubtfu rule by examining the relevant usage in actual Sanskri literature, especially the surviving works of Pāṇini's time (Brāhmaṇas and early Upaniṣads). Analysis o the internal structure of the system has even revealed underlying principles in the *Aṣṭādhyāyī* of which the commentators and the earlier Western scholars who followed them were wholly unaware (Kiparsky 1979 1982).

3. The Method of Grammatical Analysis

The *Aṣṭādhyāyī* is formulated in a morphologically syntactically, and lexically regimented form o Sanskrit. To maximize concision with a minimum o ambiguity, rules are compressed by systematicall omitting repeated expressions from them, accordin to a procedure modeled on natural language synta (*anuvṛtti*). Coordination and certain types of compounding are assigned standardized interpretations and the nominal cases of the language are used in conventional way to designate the elements of grammatical rules.

From the viewpoint of their role in the system, rule can be divided into four types: (a) definitions (*saṃjñā*) (b) metarules (*paribhāṣā*), (c) headings (*adhikāra*), an (d) operational rules (*vṛtti*).

Definitional rules introduce the technical terms o the grammar. Metarules constrain the application o other rules throughout the grammar. Headings suppl a common element for a group of rules. A headin must be read into every rule in the domain over which it is valid unless it is semantically incompatible with its wording. Headings can extend over large stretches of the grammar (over 1,000 rules in some cases), dividing it into overlapping topical sections.

Operational rules are the workhorses of the system. Subject to the applicable definitions, metarules, and headings, they carry out four basic types of operations on strings: replacement, affixation, augmentation, and compounding. The basic format of an operational rule is (1a), represented in the grammatical system by the case frame shown in (1b):

$A \rightarrow B/C\_D$ ('in the context between C and D, A is replaced by B') (1a)

$A_{\text{Genitive}}B_{\text{Nominative}}C_{\text{Ablative}}D_{\text{Locative}}$ (1b)

This use of the cases to mark the elements of rules is absolutely consistent. However, the same cases are also used in their ordinary language meanings; in general, Pāṇini's metalanguage allows ambiguity but not inconsistency. For example, the locative case, in addition to its technical use in marking a right-hand context in (1), figures in conditions limiting processes to certain meanings, dialects, genres, and connotations, such as *in the meaning 'action,' in the country of the Easterners, in Vedic literature, in a derogatory sense.*

The format in (1) covers most operational rules in the system. This includes not only standard replacement operations, but also deletion, which is treated as replacement by a null element (defined as invisibility). Several types of replacement processes, however, require a formally richer type of structural change. Certain phonological coalescence rules (*ekādeśa* 'single substitute' rules) effect replacement operations of the form (2a), and reduplication requires 'doubling' operations of the form (2b):

$AB \rightarrow C$ (2a)

$A \rightarrow AA$ (2b)

Insertion of affixes (only suffixes actually occur, prefixation being treated as compounding) is done by rules of the same format as replacement (see (1)), except that since nothing is replaced there is no genitive. Augments, which differ from suffixes in that they become part of the element they are added to, are also inserted by such rules but with a different interpretation ('A gets the augment B in the environment C_D'). A diacritic marker on the augment shows whether it is to be put before, after, or inside the base. The fourth type of operation on strings is the combination of two or more words to form a *samāsa* (compound). The format is

$A_{\text{Nominative}}B_{\text{Instrumental}}$ = 'A is compounded with B' (3)

where A is the governed member of the compound (*upasarjana*).

Lexically, the grammar makes a fundamental distinction between technical terms and ordinary language expressions. The convention on their respective interpretations is that *ordinary language expressions denote their own form and technical terms denote their referents*. Thus, the expression *gauḥ* (cow) in a grammatical rule refers only to the word *gauḥ* (not, for example, to a cow, or to words meaning 'cow,' or to words denoting particular kinds of cows), whereas the technical term *pada* (word) refers to any element that meets its definition in the system.

Two kinds of technical terms are used: 'primitive' and 'theoretical' (*śāstrīya*). The meaning of primitive terms is assumed to be known from outside grammar, partly from other sciences and partly from ordinary language. For example, the technical terms of phonetics (*śikṣā*) and of ritual and Vedic studies, and certain semantic and logical terms, are taken as primitive terms within grammar. Also primitive are the notion of a rule (*vidhi*) and such associated notions as *ādeśa* (substitute, replacement), *sthānin* (substituendum, item to be replaced), *(a)siddha* ((not) effected), *vipratiṣedha* (conflict (between rules)). Theoretical terms are defined by a network of rules in the *Aṣṭādhyāyī* on the basis of these primitive terms and lists of linguistic primes (sounds, roots, etc.). Expressions which have both an ordinary meaning and a theoretical meaning may be used in the grammar in both meanings. On the other hand, if a theoretical term is defined in the grammar, no other term, theoretical or primitive, is ever used in that meaning. In other words, ambiguity is permitted but inconsistency is not.

A large number of technical terms denote classes of linguistic elements. Some rules must apply not just to specific segments, morphemes, stems, etc., but to whole classes of them, and since the same or related classes tend to reappear in many different rules, listing all the individual members of these classes in each rule would be unnecessarily complicated. Indeed, it would be impossible, because some of these classes have no upper bound, there being no limit on the length of derived words, stems, or even roots. Providing terms for each of these classes makes it possible to refer to them in rules in a simple way. In accord with the economy requirement (*lāghava*) that governs Pāṇini's entire grammatical system, all and only the theoretical terms that can be defined within grammar are defined, and each term is defined as simply as possible and without redundancy.

Many lists of grammatical elements are divided into grammatically relevant subclasses. Instead of defining terms ad hoc for each subclass, Pāṇini provides standardized procedures for generating them from the lists themselves. In this way, the theoretical terminology includes several kinds of expressions freely generated and defined by conventional procedures specified in the grammar.

A key technique of generalization used by Pāṇini is to organize rules into hierarchies of generality. There is always an 'elsewhere' case, covered by the maximally general applicable rule (*sāmānya*), and where necessary it is restricted by special rules (*viśeṣa*), each of which can itself be restricted by still more special rules, and so on. If the set of forms to which rule A is applicable is properly included in the set of forms to which rule B is applicable, then A is automatically interpreted as superseding B in the shared domain (a convention which has been taken over in modern linguistics). This blocking relation between special and general rules can be generalized from pairs of rules to sets of arbitrary size. A special rule S can be considered to block a set $G = G_1, G_2, \ldots, G_n$ of general rules if the environments of S are properly included in the combined environments of G. Because of this convention, as well as *anuvṛtti* and other devices, the import of a rule does not come just from its wording but from its relation to other rules in the system.

The order in which the rules of the *Aṣṭādhyāyī* are to be applied is determined in the following way. In general, any applicable rule, no matter where it occurs in the grammar, is to be applied to a form, and the resulting form is again subjected to any applicable rules, until no more rules are applicable. This procedure goes a surprisingly long way. Additional constraints are, however, required for those cases where this procedure allows or even forces wrong derivations. Pāṇini clearly assumes such constraints, but he does not state them explicitly, and they must be inferred from the way he phrases his rules. Traditionally, they are assumed to be the following (see, for example, Buiskool 1939):

Rule A has priority over rule B if A is:

ordered after B (*para*) (4a)

applicable whether or not B applies (*nitya*) (4b)

conditioned internally to B (*antaraṅga*) (4c)

applicable in a proper subset of the cases to which B is applicable (*apavāda*). (4d)

These principles form a hierarchy of increasing strength, so that the last is strongest of all. All cases of 'conflict' between simultaneously applicable rules are assumed to be resolved by them. Not included in this list, but tacitly assumed by the tradition, is the 'feeding' principle, that when a rule can apply to the output of another, it does, unless this is blocked by some other constraint or rule.

The *para*-principle (4a) and the *antaraṅga*-principle (4c) have probably been overgeneralized by the tradition, though both have a valid kernel. Modern scholars agree that the former is intended to apply only in the section which provides definitions (1.4–2.3). More controversial is the claim (5) that the latter should be restricted to give priority to word phonology over sentence phonology,

The *Word-integrity Principle*: rules apply first within words and then to combinations of words. (5)

and that the *nitya* and feeding principles are to be unified into the *siddha*-principle (6), which, with the *apavāda*-principle, is solely responsible for the ordering of rules within words:

The *Siddha Principle*: when any rule is applied, the rules pertinent to its application should be 'effected' (*siddha*). (6)

Here, A is defined as 'pertinent' to the application of rule B with respect to a form F if the result of applying A and B to F in that order is different from the result of applying A and B to F simultaneously.

The advocates of the revised system (5, 6) note that it unifies the basic ordering principles, eliminates a series of subsidiary *paribhāṣās* posited to deal with the unwanted side-effects of the *antaraṅga-paribhāṣā*, and explains the wording of many of its rules. In particular, exactly in those cases where these principles would yield the wrong result for some rule, Pāṇini imposes special conditions on it to contravene them (Joshi & Kiparsky 1979). For example, a block of rules at the end of the grammar must be applied exactly in the order listed (technically, this is achieved by the condition that each rule is *asiddha* (not effected) with respect to all rules that precede it). This block of strictly ordered rules contains only rules whose relationship to the other rules of the system is not determined by (5) and (6), and rules which they in turn feed.

4. Morphology/Syntax

The *Aṣṭādhyāyī* is not rigidly divided into subcomponents, and one should beware of mechanically imposing categories of Western linguistics on it. However, there is some basis for a distinction between the rules which build up words ('morphology') and determine how they can be combined with each other ('syntax'), which form one subsystem (roughly, the rules of chs. 1–5), and the rules which determine how morphemes and words are modified in combination with each other ('phonology,' chs. 6–8).

The two types of word-formation in the *Aṣṭādhyāyī* are compounding and suffixation. Suffixation consists of adding a *pratyaya* (suffix) either to a (verbal) root (*dhātu*), or to a (nominal) stem (*prātipadika*), or to a word (*pada*). The resulting form itself belongs to one of these three categories. The following seven subtypes of word-formation occur:

(a) $[\text{Root}+\text{Suffix}]_{\textit{Root}}$: desideratives, intensives, causatives;
(b) $[\text{Word}+\text{Suffix}]_{\textit{Root}}$: denominal verbs;
(c) $[\text{Root}+\text{Suffix}]_{\textit{Stem}}$: primary (*kṛt*) suffixes;
(d) $[\text{Word}+\text{Suffix}]_{\textit{Stem}}$: secondary (*taddhita*) suffixes;
(e) $[\text{Word}+\text{Word}]_{\textit{Stem}}$: compounding;
(f) $[\text{Root}+\text{Suffix}]_{\textit{Word}}$: verb inflection;
(g) $[\text{Stem}+\text{Suffix}]_{\textit{Word}}$: noun inflection.

A 'word' is defined as anything that ends in an inflectional suffix. The definition covers indeclinable words too, for they are all assigned nominal inflectional endings, which are then deleted. Similarly, each member of a compound is a word because it contains a later deleted case ending. The reason for this procedure is that it simplifies the morphological derivation of compounds and automatically accounts for certain phonological phenomena. For example, in *rājapuruṣa* (king's servant) the first member *rājan-*, being a word, gets its correct form by an independently motivated phonological rule which deletes word-final *-n*.

A general constraint of the grammar restricts word-formation rules to semantically connected (*samartha*) elements. Hence, in a string such as *bhāryā rājñaḥ, puruṣo devadattasya* (the wife of the king, the servant of Devadatta), the semantically unrelated words 'of the king' and 'servant' cannot be compounded with each other, which would yield the incoherent **bhāryā rājapuruṣo devadattasya* (*the wife the king-servant of Devadatta).

Morphological alternants can be handled both with the replacement technique and with the blocking technique described above. In either case, one form in a set of alternating forms is chosen as basic, in such a way as to allow the simplest overall description. Unless other considerations intervene, the simplest description results if one of its actually occurring forms is chosen, and among those the one with the widest distribution. If replacement is used, the basic form is introduced by a general rule everywhere and then replaced by the other alternants in specific contexts. If blocking is used, the basic form is introduced by a general rule and the alternants by special rules which block the general rule in specific contexts. (The grammarians were well aware of the conceptual relationship between replacement and blocking; indeed Kātyāyana uses the term '*utsarga*' for the basic form in both senses, the substituendum and the 'elsewhere' form.) Pāṇini typically uses blocking in derivational morphology and replacement in inflectional morphology. There are several interesting reasons for this. The most important is that, by convention, replacements inherit the morphological properties of the elements they replace (for example, they have the same effects on the vowel shape and accent of the stem to which they are added as the original morphemes do). These properties are typically invariant in inflectional alternants, but vary in derivational alternants.

More complex relationships can be represented by a combination of the replacement and blocking techniques. This method involves setting up a wholly abstract underlying form, and a rule replacing it by the basic alternant, which in turn is blocked by the special alternant.

A descriptive problem which arises in especially acute form in dealing with *taddhita* suffixes (denominal 'secondary derivation') is that most suffixes have a range of different meanings with different stems and most meanings are expressed by several suffixes, with considerable semantic overlap between them. Modern linguistics has not found the right tools for dealing with the intricate web of polysemy and synonymy that such systems constitute. Pāṇini achieves this by organizing the *taddhita* section in an ingenious way. He separates the affixation rules from the rules assigning meanings to the affixes, which allows concurrent blocking at both the morphological and semantic level.

Unlike the phonology and morphology of the *Aṣṭādhyāyī*, the syntax is strictly structure-building. There are no rules that replace words and no rules that delete them. Passive sentences are not derived from actives, and nominalizations are not derived from sentences. They are in fact generated in parallel by the same rules in a way which permits their structural parallelism to be captured to the fullest extent. Pāṇini does assume an extragrammatical process of ellipsis, by which words which are obvious from the context can be omitted. Although ellipsis is not a rule of grammar, Pāṇini has carefully considered its consequences for his grammatical system, and explicitly taken account of them in several syntactic rules of his system. Not surprisingly since Sanskrit is a 'free word order language,' the grammar says nothing about word order, even though in fact not every permutation of words in a sentence is equally felicitous and there do exist constraints.

Pāṇini accounts for sentence structure by a set of grammatical categories which allow syntactic relationship to be represented as identity at the appropriate level of abstraction. The pivotal syntactico-semantic categories which do this are roles assigned to nominal expressions in relation to a verbal root, called '*kārakas*.' A sentence is seen as a little drama played out by an Agent and a set of other actors, which may include Goal, Recipient, Instrument, Location, and Source. These roles are systematically related to semantic categories, but the correspondence is not one-to-one. One *kāraka* can correspond to several semantic relations and one semantic relation can correspond to several *kārakas*, in ways duly stated in the grammar.

Kārakas in turn are the categories in terms of which the assignment of case and other morphological elements is formulated. They are essential to accounting for the active and passive diatheses (including impersonal passives), for the syntax of finite verbs and nominals, for the use of the cases, and for the identification of the understood agent of infinitives and participles (control). The use of *kārakas* eliminates the need for deletion or of designated null elements as in many modern treatments of these constructions, and makes the category of 'subject' unnecessary.

The key principle is that every *kāraka* must be 'expressed' (*abhihita*) by a morphological element, and none can be expressed by more than one. For example, the Agent can be expressed by the active endings and by Instrumental case, but because every role must be expressed exactly once, Instrumental case must mark the Agent if the verb is passive, and it cannot mark the Agent if the verb is active.

Another principle ensures that any given argument gets only one role. For example, in *dhanuṣā vidhyati* ('he pierces by means of a bow'—that is, with arrows shot from a bow), *dhanuṣ* (bow) satisfies both the definition of the instrument role (*karaṇa*) and the definition of the source role (*apādāna*), since it is both the 'means' for launching the arrows and the 'fixed point' from which the arrows move off, but in fact it only gets the former role, hence 'with,' not 'from' a bow (Instrumental case).

5. Phonology and Phonetics

When morphemes and words are combined, they may undergo contextual phonological modifications. Many phonological rules have morphological conditions on their operation. Some are restricted to word-final position, some to a stem-suffix boundary, some to compounds. If such a condition is shared by several rules, they can be grouped together under a heading which supplies it for the lot. Other rules apply to specific morphemes, or to classes of morphemes, ranging from general classes such as roots to utterly idiosyncratic classes whose members must be listed or identified by markers. Those phonological rules which apply across the board, both inside and across words, appear in several blocks under the heading *saṃhitāyām* (in close contact). These are the *sandhi* rules proper.

Pāṇini's grammar does not define phonetic categories but presupposes them, nor does it deal with purely phonetic combinatory processes. This is assumed to be the province of *śikṣā*. According to this remarkably sophisticated theory of phonetics, resonance (*dhvani*) in the vocal tract is produced either by tone (*nāda*), if the throat aperture is closed, or by noise (*śvāsa*), if it is open; the results are respectively voicing (*ghoṣa*) and voicelessness (*aghoṣa*). Aspiration is considered to depend on the degree of air flow (*vāyu*). High pitch (*udātta*) is ascribed to tenseness of the articulatory organs, resulting in constriction of the glottis (*kaṇṭhabila*); low pitch (*anudātta*) to relaxation of articulatory effort with consequent widening of the glottis. Pāṇini's grammar makes important use of certain phonetic notions, such as *savarṇa* ('having the same oral articulation'—but possibly differing in length, nasality, and in the laryngeal features of voicing, aspiration, and pitch; see *Ancient Indian Phonetics*).

Not all grammatically relevant categories, however, can be defined purely by their phonetic properties. A number of special conventions specify terms for purely phonological categories, which can be used in rules in exactly the same way as designations of individual sounds or morphemes. Most importantly, the underlying segments of the language are enumerated and grouped into classes in the *akṣarasamāmnāya*, popularly called the '*Śivasūtras*':

1.	a	i	u			Ṇ	(7)
2.				ṛ	ḷ	K	
3.		e	o			Ṅ	
4.		ai	au			C	
5.	h	y	v	r		Ṭ	
6.					l	Ṇ	
7.	ñ	m	ṅ	ṇ	n	M	
8.	jh	bh				Ñ	
9.			gh	ḍh	dh	Ṣ	
10.	j	b	g	ḍ	d	Ś	
11.	kh	ph	ch	ṭh	th		
			c	ṭ	t	V	
12.	k	p				Y	
13.		ś	ṣ	s		R	
14.	h					L	

The consonants at the end of each group (here capitalized for easy reference) are markers. Abbreviations (*pratyāhāras*) are defined on the *Śivasūtras* and other similarly organized lists in the following way. If a list contains the sequence of elements $\ldots x_p, x_{p+1}, \ldots x_qQ \ldots$, where Q is a marker, then x_pQ denotes the set $x_p, x_{p+1}, \ldots x_q$. (Similar lists and abbreviations are used to organize morphological paradigms.) Some examples of *pratyāhāras* defined on the *Śivasūtras* by this procedure are:

iK = i, u, ṛ, ḷ (8a)

aC = a, i, u, ṛ, ḷ, e, o, ai, au (8b)

yaṆ = y, v, r, l (8c)

jhaL = obstruent (8d)

haL = consonant (8e)

aL = segment (8f)

āhāras of two or more segments which can be formed from the *Śivasūtras*, 42 are used in the rules of the *Aṣṭādhyāyī*. The *Śivasūtras* form an indispensable part of the grammar, and the phonological classes defined by them are referred to in hundreds of rules. It is said that the god Śiva revealed these 14 classes of sounds to Pāṇini to get him started on the *Aṣṭādhyāyī*. The deeper point behind this legend is that the structure of the *Śivasūtras* is thoroughly intertwined with, and determined by, that of the *Aṣṭādhyāyī*. Indeed, if one did not have the text of the *Aṣṭādhyāyī*, but merely a pretheoretical description of Sanskrit phonology, the main properties of Pāṇini's grammar could be inferred just from the way the phonemes of Sanskrit are organized in the *Śivasūtras*. In particular, their structure is determined in large part by the requirement of economy. To be grouped together in a *pratyāhāra*, sounds must make up a continuous segment of the list. Economy requires the shortest possible list: no repetitions of sounds if possible, and as few markers as possible. Consequently, if class A properly includes class B, the elements shared with B should be listed last in A; the marker that follows can then be used to form *pratyāhāras* for both A and B. In this way economy, qua brevity, determines both the ordering of sounds and the placement of markers among them (Staal 1962). Together with the logic of the special case and the general case (*sāmānya/viśeṣa*), it fixes the structure of the *Śivasūtras* completely (Kiparsky 1991b).

As an example of how the classes so defined enter into phonological rules, consider the process which replaces *i*, *u*, *ṛ*, *ḷ* by their nonsyllabic counterparts *y*, *v*, *r*, *l* before a vowel. As the reader can verify from (7) and (8), this is the replacement of *iK* by *yaN* before *aC*. To get Pāṇini's formulation of the rule, combine *ikaḥ* (genitive), *yaṇ* (nominative), and *aci* (locative), in accord with the schema in (1), and apply *sandhi* to the combination:

6.1.77 iko yaṇ aci (9)

This rule replaces an entire *class* of vowels by the *class* of their nonsyllabic counterparts. The proper pairings *i* → *y*, *u* → *v*, *ṛ* → *r*, *ḷ* → *l* (rather than, for example, *i* → *r*) are ensured by a further general condition: among alternative possible replacements, the *closest* must be chosen. The closest of the replacements which the rule allows are precisely *y* for *i*, *v* for *u*, *r* for *ṛ*, and *l* for *ḷ*, as desired.

6. Outlook

'One of the greatest monuments of human intelligence' (Bloomfield) is only beginning to claim its rightful position in linguistics. Many of the insights of Pāṇini's grammar still remain to be recaptured, but those that are already understood constitute a major theoretical contribution. Its impact on generative grammar was felt first in phonology (the Elsewhere Condition, unmarked rule ordering), and more recently in syntax (Linking Theory). The rewards for the currently burgeoning study of morphology promise to be richer still.

Bibliography

Bronkhorst J 1981 The orthoepic diaskeuasis of the Ṛgveda and the date of Pāṇini. *Indo-Iranian Journal* **24**: 273–82

Bronkhorst J 1983 On the history of Pāṇinian grammar in the early centuries following Patañjali. *Journal of Indian Philosophy* **11**: 357–412

Buiskool J 1939 *The Tripādī*. Brill, Leiden

Cardona G 1976 *Pāṇini: A Survey of Research*. Motilal Banarsidass, New Delhi

Cardona G 1988 *Pāṇini: His Work and Its Traditions*, vol. I. Motilal Banarsidass, New Delhi

Cardona G 1990 Pāṇinian studies. In: Jha V N (ed.) *New Horizons of Research in Indology*. University of Poona, Pune

Deshpande M 1980 *Evolution of Syntactic Theory in Sanskrit Grammar*. Karoma, Ann Arbor, Michigan

Joshi S D, Kiparsky P 1979 *Siddha* and *asiddha* in Pāṇinian phonology. In: Dinnsen D (ed.) *Current Approaches to Phonological Theory*. Indiana University Press, Bloomington, Indiana

Joshi S D, Roodbergen J A F 1983 The structure of the *Aṣṭādhyāyī*. In: Joshi S D, Laddu S D (eds.) *Proceedings of the International Seminar on Studies in the Aṣṭādhyāyī of Pāṇini*. University of Poona, Pune

Kiparsky P 1979 *Pāṇini as a Variationist*. MIT Press, Cambridge, Massachusetts/Poona University Press, Poona

Kiparsky P 1982 *Some Theoretical Problems in Pāṇini's Grammar*. Bhandarkar Oriental Research Institute, Poona

Kiparsky P 1991a On Pāṇinian studies: A reply to Cardona. *Journal of Indian Philosophy* **19**: 331–67

Kiparsky P 1991b Economy and the construction of the Śivasūtras. In: Deshpande M D, Bhate S (eds.) *Pāṇinian Studies: Professor S D Joshi Felicitation Volume*. Center for South and Southeast Asian Studies, University of Michigan, Ann Arbor, Michigan

Scharfe H 1971 *Pāṇini's Metalanguage*. American Philosophical Society, Philadelphia, Pennsylvania

Sharma R N 1987 *The Aṣṭādhyāyī of Pāṇini*. Munshiram Manoharlal, New Delhi

Staal J F 1962 A method of linguistic description the order of consonants according to Pāṇini. *Language* **38**: 1–10

Staal J F 1972 *A Reader on the Sanskrit Grammarians*. MIT Press, Cambridge, Massachusetts

Staal J F 1988 *Universals: Studies in Indian Logic and Linguistics*. The University of Chicago Press, Chicago, Illinois

Thieme P 1935 *Pāṇini and the Veda: Studies in the Early History of Linguistic Science in India*. Globe Press, Allahabad

Indian Theories of Meaning

Frits Staal

Unlike some Western theories, Indian theories of meaning, though often logical or philosophical in character, are based upon a sound empirical foundation because their proponents were familiar with the techniques and results of the Indian grammatical tradition (see *Pāṇinian Linguistics*). It may be noted, furthermore, that Sanskrit terms for 'meaning' are, in general, used only of words, sentences, and other elements of language. There are no Sanskrit expressions corresponding to English 'the meaning of existence' or 'the meaning of life,' expressions that have caused much trouble in the West not only in popular speculation but also in philosophy.

1. Early Efforts

Theories of meaning arise only after centuries of effort at interpretation, and to this generalization India is no exception. The earliest Indian efforts are found in a class of prose works, the Brāhmaṇas, which from the beginning of the first millenium BC were attached to each of the Vedic schools and which interpreted not so much difficult phrases in the Vedic corpus as ill-understood points of ritual described there. A typical Brāhmaṇa passage explains why a particular rite is performed and why a particular Vedic phrase or *mantra* is recited at that time. When elucidating the mantras themselves, paraphrases are given and identities between entities are postulated, as in the following example in which the phrases from the Veda that are interpreted are given within single quotes, and in which reference is made to the deities Prajāpati, Savitṛ, and Agni:

> He offers with 'Harnessing the mind,'—Prajāpati, assuredly, is he that harnesses, he harnessed the mind for that holy work; and because he harnessed the mind for that holy work, therefore he is the harnessing one.
>
> 'Savitṛ stretching out the thoughts,'—for Savitṛ is the mind, and the thoughts are the vital airs;—'gazing reverently at Agni's light,' that is, having seen Agni's light;—'bore up from the earth'; for upwards from the earth he indeed bears this (offering).
>
> (*Śatapatha Brāhmaṇa* 6.3.1.12–13; transl. J. Eggeling.)

Like modern hermeneutics, to which it is by nature related, the Brāhmaṇas abound in interpretations that are empty, obvious, or arbitrary.

An effort at more systematic etymological interpretations of a portion of the vocabulary of the Ṛgveda was given in the *Nirukta*, Yāska's commentary on the *Nighaṇṭu* which consisted of lists of Vedic words, often arranged in groups that cover a semantic field. In the first section of the *Nighaṇṭu* there are, for example, 23 words for 'night.' There are also sections dealing with ambiguous words, that is, words that have two or more distinct meanings; in such cases, the *Nirukta* provides different etymologies, often fanciful, for each of these meanings. There are also general discussions on the parts of speech and their general meanings, for example: 'verbs express "becoming" and nouns, "being".' The *Nirukta* seems to belong to approximately the fifth century BC, the same period as the grammar of Pāṇini (most scholars have treated the *Nirukta* as preceding Pāṇini because of the undoubted priority of the Vedic to the grammatical tradition; according to Paul Thieme, however, Pāṇini is earlier than the *Nirukta*).

2. The Grammatical Tradition

The grammatical tradition started as an ancillary science to the Vedas, but it was different from the other ancillary sciences in that it neither restricted itself to a particular school nor provided separate grammars for each of the schools (like the *Prātiśākhyas* did for phonology). It pertained to all the schools. Linguistics attained full independence from the Vedas when Pāṇini shifted attention to the ordinary, daily speech of his contemporaries. Among the early grammarians, Patañjali (150 BC) is most explicit, when he states that ordinary speech is the empirical material or means of knowledge upon which the study of grammar is based:

> A man who wants to use a pot, goes to the house of a potter and says: 'Make a pot, I want to use it.' But a man who wants to use words does not go to the house of a grammarian and say 'make words, I want to use them.' When he wants to express a meaning he uses the appropriate words.
>
> (*Mahābhāṣya* 1.1.1)

Grammar includes the study of regional usage, e.g., 'Southerners are fond of *taddhita* suffixes,' and deals with special cases such as shouting from afar or the idiom of gamblers.

The grammar of Pāṇini (ca. 500 BC) seems, at first sight, to refer to the meanings of words only haphazardly. Accordingly, it has long been held that Pāṇini dealt almost exclusively with phonology and morphology and neglected not only syntax but also semantics. This view, however, cannot be maintained. Pāṇini's grammar deals with both the meaning of words and the meaning of sentences. The latter analysis is naturally based on his treatment of syntax, which is not only insightful but also extensive. The extent to which his syntactical theories capture the entire domain of Sanskrit syntax remains a subject of discussion.

2.1 Word Meaning

Pāṇini's grammar refers to the meaning of words in two distinct cases:

(a) In the grammar itself if meanings determine form, as in: *khaṭvā kṣepe* (2.1.26), '*khaṭvā* "bed" is compounded in the Accusative in a Tatpuruṣa compound when an insult is implied.' Example: *khaṭvārūḍha* 'lying on the bed' which means: 'rude, of bad behaviour.'

(b) In a list of about 2,000 verbal roots, the *Dhātupāṭha*, in which the verbs are classified in accordance with the 10 classes of verbs distinguished by Pāṇini in his grammar. Some scholars have doubted that the earliest *Dhātupāṭha* known was composed by Pāṇini, but, whatever is the case, there is little doubt that a *Dhātupāṭha* with a similar structure and methodology, adapted to the structure of the grammar, was used by him. Following the eleventh-century grammarian Kayaṭa, others have argued that the meaning entries were added later, but there is no reason to accept this view (Bronkhorst 1981).

In the *Dhātupāṭha*, each verbal root is indicated by a metalinguistic marker and followed by its meaning, expressed by a noun in the locative case, that is, in the form 'root X in the meaning of Y.' The roots with their markers are treated like nouns: for example, a root with suffix *-i* is declined like a noun ending in *-i*, and *sandhi* rules apply to its combination with the following word. Some of the meanings are given in terms of nouns derived from the same verbal root so that the information is circular and uninformative. When there are several meanings, these are distinguished and different metalinguistic elements are used to distinguish the roots from each other. The following are examples from the fourth and seventh classes:

iv, 68	*yuja samādhau* 'the root *yuj-* in the meaning of concentration'
vii, 7	*yujir yoge* 'the root *yuj-* in the meaning of conjunction.'

Like Pāṇini's grammar itself, the *Dhātupāṭha* is part of the Indian scholarly tradition and its traditional curriculum that characterizes the Indian *paideia* of a classical education. Throughout the centuries, Sanskrit authors have referred to it whenever meanings are discussed. For example, the main commentary on the *Yogasūtra*, the *Yogasūtrabhāṣya* attributed to Veda Vyāsa of the seventh or eighth century AD, says in commenting on the first *sūtra*:

> Doubt as to the actual thing (*yoga*) is occasioned by doubt as to the meaning of the word. This doubt is removed by stating that in the language of the *sūtra*, *yoga* is etymologically derived from the root *yuja* in the sense of concentration and not from the root *yuji* in the sense of conjunction. [This comment shows, incidentally, that most contemporary interpretations of *yoga* in terms of 'union' are mistaken.]

2.2 Sentence Meaning

Sentence meanings are derived with the help of the *kāraka* theory. *Kāraka* relations, like 'deep structures,' occupy a level between semantic interpretations and surface structures. This level of linguistic analysis was intentionally added; it does not depend on historical accident and has little to do with 'mismatch' or 'tension,' terms used by Deshpande (1991) in an otherwise interesting hypothesis about its ritual backgrounds. There is need for such a level because there is no one-to-one correspondence between the levels, as illustrated by the following example (see Kiparsky & Staal 1969: 85). The sentence *akṣair dīvyati* (he plays (with) dice) has as part of its semantic interpretation the information that the dice stand to the action of playing in the instrument relation which is expressed by the instrument (*karaṇa*) *kāraka*, realized on the surface level by the suffix *-bhis* which becomes *-ais* yielding:

> **akṣais dīvyati*

which subsequently, because of a *sandhi* rule, turns into:

> *akṣair dīvyati* 'he plays with dice'

But the semantic interpretation of this sentence also contains the information that dice stand to the action of playing in the *object* relation which is expressed by the object (*karman*) *kāraka*, realized on the surface level by the suffix *-ān* yielding:

> *akṣān dīvyati* 'he plays dice'

Pāṇini distinguishes seven *kāraka* relations characterized in semantic terms as follows:

(a) *apadāna* 'the fixed point from which something recedes' (1.4.24);
(b) *sampradāna* 'indirect object' (1.4.32);
(c) *karaṇa* 'the most effective means' (1.4.42);
(d) *adhikaraṇa* 'locus' (1.4.45);
(e) *karman* 'what is primary desired by the subject' (1.4.49);
(f) *kartṛ* 'what is independent' (1.4.54);
(g) *hetu* 'what prompts the *kartṛ*' (1.4.55).

This system accounts for the meaning of sentences and complex meaning relationships between sentences by using mechanisms such as illustrated in the dice-playing example, that is, by systems of rules that operate between the different levels and that are carefully ordered and related to each other. The resulting derivations account for equivalencies like those between the Active and the Passive. Other illustrations are discussed in Kiparsky & Staal (1969) including the causative relations that make use of the *hetu kāraka*, which accounts for meaning relationships between sentences such as *The elephant-driver mounts the elephant* and *The elephant allows itself to be mounted by the* *elephant-driver*, or *The pupil learns grammar from the teacher* and *The teacher teaches grammar to the pupil.* Such meaning relationships, then, are treated by the grammar and not relegated to a dictionary.

The *kāraka* system also accounts for the meanings of nominal compounds and various other nominal forms that are related to simple sentences, for example, *maker of pots*, *pot-maker = potter*, in addition to: *he makes pots*, *pots are made by him*, etc.

In the realm of theoretical semantics, Pāṇini made an important discovery (Brough 1951): the distinction between 'use' and 'mention.' In ordinary Sanskrit, a 'mentioned' or 'quoted' expression is indicated by the particle *iti* which follows it, that is, English '*a*' corresponds to Sanskrit *a-iti*. Since grammar deals in the majority of cases with the form of expressions and not with their meaning or use, the grammar would be riddled with such *iti's*. Grammarians have accordingly restricted ordinary usage, and expressions without *iti* refer to their *form*.

The underlying distinction between language and metalanguage is explicit in Pāṇini, the latter being referred to as *upadeśa* (literally, 'teaching'). Metalinguistic elements like the suffix -*i* attached to verbal roots are called *anubandha* ('marker'). They do not belong to the language that is the object of the description, i.e., Sanskrit. For example, the Sanskrit root referred to is *yuj*, not *yuji* or *yuja*. In the finally derived surface forms, the *anubandha* marker has to be removed. Patañjali explains how this is similar to ordinary usage—a crow that sits on the roof of a house, for example, may be utilized to identify the house: '"Which of these two is Devadatta's house?" "That where the crow sits." When the crow flies away and the house is no longer marked, one knows in consequence which house was indicated' (*Mahābhāṣya*, ed. Kielhorn 84.21–85.3). Similarly, English grammar has to account formally for the fact that the past tense of 'drive' is 'drove,' not 'drive + *ed*' or 'drive + *past suffix -ed.*'

The *sūtras* or rules of grammatical description belong to the metalanguage of grammar. But there is a higher, meta-metalevel to which the metarules (*paribhāṣā*) of grammatical description belong. The most famous of these is a rule that safeguards the consistency of at least part of the grammar by eliminating contradictions: *vipratiṣedhe paraṃ kāryam* 'in case of contradiction, the latter (rule) prevails (over the former)' (1.4.2).

In order for this rule to apply, the rules were listed in a specific order. The discovery of rule order is therefore closely related to that of metalanguage. The use made of metarule 1.4.2 proves, incidentally, that the Sanskrit grammarians recognized and utilized the principle of noncontradiction. This principle was formulated and adhered to at the same time or earlier in the ritual manuals, and subsequently in Indian logic and in most of the philosophical systems.

3. Philosophical Theories of Meaning

The following three sections include only a sample of Indian theories of meaning, excluding much that is of later date and all the Jaina and Buddhist contributions.

3.1 Mīmāṃsā Theories

The Mīmāṃsā (short for Pūrva- or Karma-Mīmāṃsā) is a system of ritual philosophy that provides a particular interpretation of the Vedas. It is similar to the Brāhmaṇas in this respect, but it has incorporated the methodology of the ritual and grammatical *sūtras* and is therefore more principled and systematic. According to the Mīmāṃsā, the core of the Veda consists of 'injunctions' (*vidhi*). The logical and semantical analysis of these is of special interest from a comparative point of view because it complements the prevailing paradigm of sentence interpretation in Western logic and philosophy, which have long looked upon sentences as if they were primarily statements. The excessive preoccupation of the Mīmāṃsā with the optative corresponds to the Western obsession with the indicative.

The stock example of *vidhi* is the injunction expressed by *yajeta* 'he shall sacrifice.' According to the grammatical analysis which the Mīmāṃsā accepts, this expression consists of the verbal root, *yaji* (where -*i* is the indicatory element) and the optative ending -*eta*. According to the Mīmāṃsā philosophers, the principal semantic feature of this composite expression is not the root but the ending, because it is through the ending that a word is brought in relation to other words. The ending in turn expresses two elements: 'general verbality' (*ākhyātatva*) and 'optativeness' (*liṅtva*). Of these two, the latter is again the marked feature, for every verb denotes an action but only the optative force is prompted by the Vedic injunctions. This optative force is 'the ultimate of ultimates, the peg on which the whole system of Vedic duty hangs' (Edgerton 1928: 176).

The grammarians had already characterized the sentence in terms of its final verb. The Prabhākara Guru school of Mīmāṃsā extended the analysis of Vedic injunctions in a similar spirit to the more general semantic theory of *anvitābhidhāna*, according to which the meaning (*abhidhāna*) of a sentence is a single entity that depends on the *combined* meanings of its constituent elements (*anvita*). The other Mīmāṃsā school, that of Kumārila Bhaṭṭa, was satisfied with the apparently simpler and more commonsensical theory, that the meaning of a sentence arises from *abhihitānvaya*, a stringing together or collection (*anvaya*) of the meanings of its constituent elements (*abhihita*). The former theory is closely related not only to the analysis of Vedic injunctions but also to a logical or syntactic analysis in which sentences (not necessarily statements) are the main units of discourse. The latter theory is more easily related to a dictionary-oriented semantics.

The theory that sentence meaning depends on word meaning is especially unsatisfactory when trying to account for logical connectives such as negation and other syncategoremata. This problem is not solved by introducing dictionary entries such as 'Neg,' for '*not-A* is not a function of *not* and *A*, but a recursively defined expression.' Thus, *He did not do it* is analyzed as 'it is not the case that he did it.' This goes back, in historical terms, to the Aristotelian insight that 'the negation of the sentence is the negation of the predicate,' which is reflected in turn by the logical symbolism F(a), formed so that the negation of $F(a)$ is $\sim F(a)$, or, more explicitly (as in the *Principia Mathematica*):

$$(F(a))\leftrightarrow((\sim F)(a)).$$

That the meaning of not-A is not a function of the meanings of not and A was obvious to the followers of the *anvitābhidhāna* theory. But they went further and constructed a theory of negation which is richer than most Western theories because it includes injunctions. This theory may be expressed with the help of symbols that directly translate the basic Mīmāṃsā concepts. Let sentences be expressed as functions with two functors, A (*ākhyātatva*, 'verbality') and L (*liṅtva*, 'optativeness'), for example:

$L(A(k))$, 'the knot (k) should be (L) tied (A).'

Now, if one expresses negation again by $\sim$, there are two possible negations:

$\sim L(A(k))$, 'the knot should not be tied'

and:

$L\sim(A(k))$, 'the knot should be untied.'

The Mīmāṃsā took another step and introduced the negation of terms, which the above formalism in fact suggests, but which is not used in Western logic (where the equivalent is expressed in the theory of classes by means of complementation):

$L(A(\sim x))$, 'the not-knot should be tied.'

This is interpreted as: 'another knot should be tied.' These types of negation were arrived at because of the existence of traditional injunctions such as *ananuyājeṣu yeyajāmahaṃ kuryāt* ('at the not-after-rites he should say "Ye-Yajāmahe"') which is not interpreted as: 'at the after-rites he should *not* say "Ye-Yajāmahe"' but as: 'at rites *other than* the after-rites he should say "Ye-Yajāmahe".'

The correctness of the *anvitābhidhāna* theory was also argued from learning theory. A child who hears his father use the sentences *gāmānaya* and *aśvamānaya* first understands the meanings of the entire expression from the context or situation: in the first instance, he sees someone go and return with a cow; in the second, with a horse. The child concludes that the two sentences mean: 'bring a cow' and 'bring a horse,' respectively. Then, by analysis of identity and difference or a substitution procedure, he arrives at the word meanings and concludes that *gām* means 'cow,' *aśvam* 'horse,' and *ānaya* 'bring.' Only later will he discover that endings such as *-m* are suffixes which express the relation of the words to each other. This process of analysis, called *anvayavyatireka*, was mentioned, probably for the first time, by Kātyāyana in a *vārtikkā* (*Mahābhāṣya* 1.2.2) and was widely used by the grammarians.

The Mīmāṃsā made several other contributions to the theory of meaning. The Wittgensteinian slogan that the meaning of a word lies in its use was not only known much earlier in the West by Latin schoolmasters as *verba valent usu*, but also in India by the followers of the Mīmāṃsā and other theorists who accepted the principle that *rūḍhi*, the conventional meaning, established by usage, is stronger than *yoga*, the meaning arrived at by etymological derivation. Thus for example, *dvirepha* (etymologically 'two (*dvi*) r's (*repha*)') does not mean 'two r's' but 'bee.' (The reason is that another word for 'bee,' *bhramara*, has two r's.) The Mīmāṃsā analysis went further by distinguishing four classes of words:

(a) *rūḍha*, 'conventional,' e.g., *dvirepha*;
(b) *yaugika*, 'derivative,' e.g., *pācaka* 'cook' from *pac-* 'to cook';
(c) *yogarūḍha*, 'both derivative and conventional,' e.g., *paṅkaja* 'anything that grows in mud' (*paṅka*), but also more specifically 'lotus' (which does grow in the mud);
(d) *yaugikarūḍha*, 'either derivative or conventional,' e.g., *aśvagandhā* which can mean either 'smelling like a horse' (*aśva*) or refer to a particular plant (which does not smell like a horse).

3.2 Bhartṛhari

Bhartṛhari, a fifth-century philosopher from Kashmir, northwest India, influenced by Vedāntic and Buddhist ideas, erected in his *Vākyapadīya* a metaphysical superstructure on the traditional semantics with which he was intimately familiar (he wrote a subcommentary on Patañjali's commentary on Pāṇini). In this metaphysics, the principle of the universe is a 'language principle' (*śabdatattva*; sometimes translated as 'speech essence'), unchanging and without beginning or end. It introduces time, that is, past, present, and future, into the world of names and forms (*nāmarūpa*).

The principle of the universe may be grasped by a timeless, unitary flash of experience which Bhartṛhari called *pratibhā* (intuition). But the meaning of a sentence is also grasped by *pratibhā*; in fact, it *is pratibhā*. This doctrine reacts to the theory of sentence perception of Nyāya logicians and others, according to which the process of understanding follows the hearing of the sentence that is being uttered in time, from beginning to end; when the last word is perceived, the meaning is finally grasped. Bhartṛhari's doctrine adds innate order and syntax to one's understanding and thereby changes the philosophic perspective: instead of a barren empiricism he offers an insight into the deep structure of language.

According to Mark Sideritis (1985: 137), this theory 'would have us believe that the notion of word meaning is the product of a misleading analysis of linguistic phenomena,' which is counterintuitive and conflicts with the work of lexicographers. This is almost true. According to both Bhartṛhari and the Mīmāṃsā *anvitābhidhāna* theory, word meaning is arrived at by abstraction and *anvayavyatireka*, that is, by comparing forms that are partly identical and partly different—for example *gāmānaya* (bring-the-cow) and *aśvamānaya* (bring-the-horse); see above—but it is not therefore 'misleading.' From a historical point of view, these sentence-centered theories reflect the development of the Indian tradition of language analysis which started with the cutting up of the continuous flow of sounds of the Vedic Saṃhitā into the word-for-word representation of the Padapāṭha.

Bhartṛhari's view that the relation between words and meanings is based upon *samaya* (convention), has caused confusion (as have Saussure's and Carnap's quite dissimilar contentions), but it has recently been shown that Bhartṛhari's term denotes 'established usage' where 'established' implies a tradition of elders (Houben 1992). The question as to whether the first establishment was arbitrary does not arise, since Sanskrit is held to be eternal.

Most publications on the *Vākyapadīya* confine themselves either to philology or to the metaphysics of its early parts. The semantico-philosophical speculations, especially of the third part, still await a thorough investigation from a linguistic point of view.

3.3 Later Doctrines

From the insights of the Mīmāṃsā and the gradually improving logical analysis of the Nyāya, semantic theories of great richness and depth developed and were adapted by most of the later philosophical schools. They were also put into practice by the literary critics of Indian poetics and aesthetics (*Alaṃkāraśāstra*). The latter tradition had been inspired by one of the classics of Sanskrit literature, Bharata's *Nāṭyaśāstra* (seventh century AD?), which dealt primarily with dramaturgy, dance, and music. This tradition was developed especially in Kashmir, the home not only of Bhartṛhari but also of Kashmir Śaivism and Tantrism. A good idea of the insights and subtleties of the resulting scholarship can be obtained by immersing oneself in the recent translation of Ānandavardhana's *Dhvanyāloka* ('Light on (the Doctrine of) Suggestion'), with its commentary *Locana* ('the Eye') by the critic, philosopher, and Śaiva mystic Abhinavagupta (Ingalls, et al. 1989). This article can do no more than list the elements of such treatises and the traditions they represent.

Indian theorists were familiar with many problems of word meaning, but the idea of sentence meaning occupied the central place in Indian semantics. The early grammarians had evolved the doctrine that a sentence is 'what possesses a finite verb,' a step beyond the naive idea that it was simply 'a collection of words.' The Mīmāṃsā developed the theory of *ākāṅkṣā* or 'mutual (syntactic) expectancy' as an additional criterion required for full sentencehood. They argued that a sentence is neither a collection of words such as *cow horse man elephant*, nor one that possesses a finite verb such as *cow irrigates man elephant*. *He irrigates with water*, however, is a sentence because there is a mutual syntactic connection, *ākāṅkṣā*, between all its constituent words.

Such an *akāṅkṣā* also exists between the words of *he irrigates it with fire*, and yet this is not a sentence. One says that such a sentence is 'syntactically' but not 'semantically' well formed. According to the Indian theorists, another criterion must be fulfilled: a sentence must possess *yogyatā* (semantic compatibility). This is present in *he irrigates it with water* and absent from *he irrigates it with fire*, and also from such expressions as:

> There goes the barren woman's son with a chaplet of sky-flowers on his head. He has bathed himself in the waters of a mirage and is holding a bow of rabbit's horn.
> (Bhattacharya 1962: 141)

As a further condition, *āsatti* or *saṃnidhi* (contiguity) is required; it eliminates the case of words that are separated by other words or uttered at long intervals (we would regard this requirement as pertaining to performance, not competence). The final requirement is *tātparya* (speaker's intention), a controversial and much debated concept that reminds us of some of the work of Paul Grice. There are Buddhist parallels (for example *ābhiprāyika*; see Ruegg 1985, 1988). The underlying idea of *tātparya* is that the denotative power of words is fixed, but when constructing and uttering a sentence, the intended meaning that is conveyed may depend on the 'speaker's intention' (*vaktrabhiprāya*).

The intended meaning need not be individual; it can be part of the culture. This is reflected by a similar concept, *vyañjanā* (suggestion), that was developed by the literary critics of the Alaṃkāra school. When a poet refers to *gaṅgā* (the river Ganges), this carries the suggestion of coolness and purity, but not necessarily, however, for that suggestion is absent in the bare statement 'there are many fish in the Ganges' (quoted by Ingalls, et al. 1989: 579).

The metaphorical use of language was invoked in philosophical contexts, for example, by the followers of the Advaita Vedānta. In 'great statements' such as the Upaniṣadic *tat tvam asi*, traditionally (but erroneously: see Breloer 1986) interpreted as 'thou art that,' the reference to the Absolute is not through the primary meaning of the word, but through its secondary meaning (*lakṣaṇā*). Secondary meaning may exclude primary meaning (*jahallakṣaṇā*), include it (*ajahallakṣaṇā*), or both include and exclude it (*jahalajahallakṣaṇā*). An example has already been cited of the first: *dvirepha* ('with two r's') which denotes 'bee,' but bees do not possess r's. An example of the second is *kuntāḥ praviśanti*, literally, 'the lances enter,' which refers to the men who carry lances but also to the lances themselves. An example of the third is the *tvam* ('thou') of the Upaniṣadic statement *tat tvam asi*: this does not refer to the person in the dialog, namely, Śvetaketu son of Uddālaka, but denotes his universal self, stripped of all individual attributes such as limited intelligence.

According to the later logicians, when a sentence, thus characterized as a string of words with *ākāṅkṣā*, *yogyatā*, and *āsatti*, is uttered, it generates in the hearer a cognition of its meaning (*śabdabodha*). This cognition is a single entity, but since it may be complex, it is analyzed in terms of recursively applied expressions of the form *X which is qualified by Y*,' that is 'X which is qualified by (Y which is qualified by Z...),' etc. This analysis in terms of nominal expressions conflicts with the grammarians' analysis that presents a sentence as a verbal form with nominal (and other) adjuncts. The meaning cognition of *Hari sees a bird*, for example, is analyzed by the logicians as: 'the operation generating the activity of seeing which has a bird as object is qualified by Hari as its doer.' Such an analysis is not merely 'artificial'; it is an expression of an artificial language which is well formed in accordance with the principles of its construction. Attempts at formalization have accordingly been made, by Matilal and others (see Matilal 1968, 1988; Staal 1988: 249–55).

Bibliography

Even confined to publications in English, the literature on Indian theories of meaning is extensive. The present article is based on various sources referred to, along with many others, in Staal (1988). The most useful general introduction remains Kunjunni Raja (1963).

Bhattacharya B 1962 *A Study in Language and Meaning: A Critical Examination of Some Aspects of Indian Semantics*. University of Calcutta, Calcutta

Brereton J P 1986 'Tat Tvam Asi' in Context. *Zeitschrift der deutschen morgenländischen Gesellschaft* **136**: 98–109

Bronkhorst J 1981 Meaning entries in Pāṇini's *Dhātupāṭha*. *Journal of Indian Philosophy* **9**: 335–57

Brough J 1951 Theories of general linguistics in the Sanskrit grammarians. *Transactions of the Philological Society* 27–46

Cardona G 1975 Paraphrase and sentence analysis: Some Indian views. *Journal of Indian Philosophy* **3**: 259–81

Deshpande M M 1991 Prototypes in Pāṇinian syntax. *Journal of the American Oriental Society* **111**: 465–80

Houben J E M 1992 Bhartṛhari's *Samaya*/Helarāja's *Saṃketa*. *Journal of Indian Philosophy* **20**: 219–42

Ingalls D H H, Masson J M, Patwardhan M V (transl.) 1989 *The* Dhvanyāloka *of Ānandavardhana with the* Locana *of Abhinavagupta*. Harvard University Press, Cambridge, Massachusetts

Kiparsky P, Staal F 1969 Syntactic and semantic relations in Pāṇini. *Foundations of Language* **5**: 83–117

Kunjunni Raja K 1963 *Indian Theories of Meaning*. The Adyar Library and Research Centre, Adyar, Madras

Matilal B K 1968 *The Navyanyāya Doctrine of Negation. The Semantics and Ontology of Negative Statements in Navyanyāya Philosophy*. Harvard University Press, Cambridge, Massachusetts

Matilal B K 1988 Śābdabodha and the problem of knowledge-representation in Sanskrit. *Journal of Indian Philosophy* **16**: 107–22

Ruegg D S 1985 Purport, implicature and presupposition: Sanskrit *abhiprāya* and Tibetan *dgoṅs pa*/*dgoṅs gži* as hermeneutical concepts. *Journal of Indian Philosophy* **13**: 309–25

Ruegg D S 1988 An Indian source for the Tibetan hermeneutical term *dgoṅs gži* 'intentional ground.' *Journal of Indian Philosophy* **16**: 1–4

Sideritis M 1985 Word meaning, sentence meaning and *apoha*. *Journal of Indian Philosophy* **13**: 133–51

Staal F 1988 *Universals: Studies in Indian Logic and Linguistics*. University of Chicago Press, Chicago, Illinois

Tabler J A 1989 The theory of the sentence in *Pūrva Mīmāṃsā* and Western philosophy. *Journal of Indian Philosophy* **17**: 407–30

Tarkatirtha Pandit V 1992 The *Nyāya* on the meaning of some words. *Journal of Indian Philosophy* **20**: 41–88

Tola F, Dragonetti C 1990 Some remarks on Bhartṛhari's concept of *pratibhā*. *Journal of Indian Philosophy* **18**: 95–112

Ancient Indian Phonetics

Madhav M. Deshpande

1. Ancient Indian Phonetics

The term 'Ancient Indian Phonetics' refers here to the tradition of phonetic analysis and description of Sanskrit which developed in ancient India. This branch of analytic study of Sanskrit first developed as one of the traditional tools used for the preservation and propagation of the Vedas, the religious scriptures of the ancient Hindus, and it eventually came to be incorporated in a vastly developed tradition of Sanskrit grammar. While the Vedic literature was originally composed by individual Vedic priests and was orally maintained by generations of Vedic priestly families, eventually the Vedic texts came to be collected and edited into organized volumes, and systematic efforts were made to preserve both the texts themselves as well as the understanding of the meaning and the ritual application of these texts. The results of this organized effort have survived in the form of manuals of various kinds pertaining to various Vedic schools. Among these manuals, many deal with topics of linguistic interest, that is, phonetics (*Śikṣā*), metrics (*Chandas*), etymology (*Nirukta*), and grammar (*Vyākaraṇa*).

The treatises on phonetics, generally divided into two types called *Śikṣā* and *Prātiśākhya*, deal with specific Vedic texts and their recitation, rather than Sanskrit or Vedic language as such. This makes the phonetic manuals very special in some sense. The observations contained in the phonetic manuals are of a nongeneralized, highly specific nature, and thus they provide a microscopically detailed picture of the sounds of Sanskrit as used in specific oral scriptural traditions. They contain a highly developed set of analytic tools and terminology which has won the admiration of Western linguists and Sanskritists ever since the discovery of Sanskrit by the West (cf. Whitney 1866; Allen 1953: 3ff.).

2. Origins of Sanskrit Phonetics

The various Vedic texts were produced in different regions of India, beginning about 1500 BC in the northwestern corner, and the texts produced in one region were carried orally into other areas. During this movement, there was social and linguistic contact and convergence with peoples who were historically of non-Indo-European backgrounds, for example, Dravidians, Tibeto-Burmans, and Austro-Asiatics. As a result of this contact and convergence, the Indo-Aryan dialects continuously went on changing, and slowly a gap began to develop between the language of the preserved ancient scriptures and the language of contemporary colloquial usage. This gap began to affect both the phonetic form of the orally preserved scriptural texts as well as their comprehension. A realization of this gap and its perceived negative impact on the preserved scriptural texts is indeed the starting point of the development of the analytic efforts reflected in the manuals left by the Vedic schools. On the phonetic side, it is quite clear that the same text was pronounced with slight differences, eventually leading to doubts as to the exact wording. Emergence of sounds such as the retroflex consonants within the Indo-Aryan dialects was a gradual process leading to more or less retroflexed versions of the same Vedic text. The accents of ancient Vedic dialects were preserved as musical pitch variation in the recitation of Vedic texts, but these were no longer used in the colloquial contemporary dialects. Thus, it became increasingly difficult to pronounce the Vedic texts naturally with proper accents. The late Vedic texts (e.g., *Śatapatha-Brāhmaṇa* 1.6.3.8) narrate an interesting story about how a demon named Tvaṣṭṛ mispronounced a ritual expression and achieved disastrous results. The demon wished to have a son who would slay the god Indra. Thus, he should have asked for a son who would be *indra-śatrú*, 'Indra's slayer.' However, being an ignorant demon, he mispronounced this expression as *índra-śatru* which gave him a son who was killed by Indra. This story has been cited by phoneticians and grammarians to indicate why it is so important to learn how to pronounce the Vedic scriptures properly.

The prescientific phase of Sanskrit phonetics is already manifest in the earliest Vedic literature. The terms *akṣara* 'letter, sound, syllable' and *pada* 'metrical foot' go back to the earliest phase of the Vedic literature. Thieme (1985) has presented an important conjecture concerning the beginnings of Sanskrit phonetics. Thieme translates the first verse of the *Śaunakīya-Atharvaveda* as follows: 'The thrice seven that go around, wearing all the shapes—let the Lord of Speech put their powers into my body's parts today.' After detailed argumentation, Thieme concludes that this verse refers to the 21 sounds of Sanskrit as distinctly conceived by the earliest Vedic thinkers, and he lists them as follows (1):

a i u ṛ e o ai au	8 vowels	(1)
y r l v	4 semivowels	
k c ṭ t p	5 occlusives	
ś ṣ s h	4 spirants.	

Thieme (1985: 563) argues that 'the sacred number "thrice seven" could indeed be taken as the number of the abstract forms (*ākṛti-*), of the types, the kinds (*varṇa-*) of sounds of the sacred language.' Such a listing, if indeed this is what is intended by the verse, would indicate that certain phonetic features were perhaps understood more clearly by this time than others, and that the number 21, in all likelihood, is a reflection of this early prescientific phase, rather than an explicit representation of the 'types' of Sanskrit sounds as found in the later developed texts on Sanskrit phonetics. Perhaps the distinctions between the different points of articulation were implicitly understood, while the distinctions of quantity, voicing, aspiration, etc. were not arrived at. In the late Vedic texts like the *Aitareya-Āraṇyaka* (2.2.4) and *Chāndogya-Upaniṣad* (2.22.5), vowels (*svara*) are distinguished explicitly from consonants (*vyañjana*), and, among the consonants, a distinction is made between stops, that is, *sparśa* 'contact sounds,' and spirants, that is, *ūṣman* 'aspiration sounds.' The *Aitareya-Āraṇyaka* (3.2.1) reveals that the specific category of semivowels (*antasthā/antaḥsthā*) was newly proposed by the scholar, Hrasva Māṇḍūkeya, but that it was as yet not acceptable to the author of the *Aitareya-Āraṇyaka*. It is clear from other evidence (cf. Deshpande 1979: 261) that the scholarly tradition of Hrasva Māṇḍūkeya came from the northeastern region of Magadha, and that it represents an innovative tradition, which among other things admitted more retroflexion into the oral text of the *Ṛgveda*, and that its views were contested by others.

3. Emergence of Formal Phonetic Analysis

Sometime around 700 BC, a standardized ordered alphabet of Sanskrit called *akṣara-samāmnāya* had come into existence. This standardization was necessitated, among other things, by an increasing diglossic gap between the language of the orally preserved Vedic texts and the contemporary Sanskrit, as well as the vernacular languages. There was a perceived loss of the natural ability to pronounce and recite the Vedic scriptures correctly. The discussions concerning the need to study Sanskrit phonetics as seen in the introductory chapter of the *Mahābhāṣya* of Patañjali (around 100 BC) show that the origin of the analytic tradition of Sanskrit phonetics lies in the urge to preserve the standardized pronunciation of the Vedic texts and to protect them from further degeneration.

The earliest scholars who seem to have paid attention to the form of the Vedic texts, especially their wording and pronunciation, are Śākalya, Śūravīra Māṇḍūkeya, and Hrasva Māṇḍūkeya. The *Aitareya-Āraṇyaka* points to the fact that Śākalya followed the tradition of the Māṇḍūkeyas to a large extent. These authorities were also perhaps some of the earliest scholarly figures who attempted to construct rules for combining words to produce a continuous scriptural text (*saṃhitā*). The general assumption seems to have been that the continuous Vedic texts needed to be explicitly produced by applying the rules of sandhi to the word-by-word texts provided by scholars like Śākalya. Thus, these early traditions did not offer any details on how to segment the received continuous texts, but they were engaged in figuring out the rules of sandhi which applied to the word-by-word texts to recreate the continuous texts. Thus, the concern of these early phoneticians and exegetes was twofold, that is, the proper pronunciation of the Vedic texts and figuring out the rules for performing sandhi operations on the word-by-word texts to produce the continuous texts. The first concern was responsible for developing the analytical study of the articulation of sounds, while the second concern was responsible for the search for features and groupings of these sounds which may be used in defining the rules of sandhi. In these two concerns can be seen the origins of the phonetic and phonological theories of the ancient Indian phoneticians and grammarians.

The word *śikṣā* refers to training in general, and phonetic or recitational training in particular. It appears in the *Taittirīya-Upaniṣad* (1.2), which refers specifically to six types of training involved in phonetic education, that is, *varṇa* 'sounds,' *svara* 'accents,' *mātrā* 'quantity,' *bala* 'force,' *sāma* 'even articulation,' and *santāna* 'continuity in recitation.' In later times, over 100 texts called *Śikṣās* were produced by different authorities. Most of the surviving *Śikṣā* texts are of a relatively late period. The most well known among these *Śikṣās* is the *Pāṇinīya-śikṣā* attributed by the tradition to the famous Sanskrit grammarian, Pāṇini. Other important *Śikṣās* include the *Vyāsa-śikṣā*, the *Āpiśali-śikṣā*, the *Yājñavalkya-śikṣā*, and the *Nārada-śikṣā*. A few of these *Śikṣā* texts, such as the *Pāṇinīya-śikṣā* and the *Āpiśali-śikṣā*, are nonsectarian in the sense that they do not attach themselves to a particular Vedic school, and deal with the Sanskrit language in a generic way. However, most *Śikṣā* texts are sectarian. They are attached to particular Vedic schools, and deal with the recitation of particular Vedic texts. They often provide the most minute details of the recitational practice.

The second category of texts dealing with Sanskrit phonetics, traditionally considered to be more authoritative than the *Śikṣās*, is represented by the *Pratiśākhyas*. As the word *Prātiśākhya* (from *prati* 'each' + *śākhā* 'branch') suggests, each branch of the Vedic literature was ideally expected to have a *Prātiśākhya* text attached to it. Among the surviving texts of this type, the following treatises deserve particular mention. The *Ṛgveda-Prātiśākhya* attributed to Śaunaka belongs to the *Śaiśirīya* branch of the *Ṛgveda*, which is no longer extant. It refers to the views of Śākalya, whose edition of the *Ṛgveda* survives, but there is no extant *Prātiśākhya* attributed to Śākalya. The *Taittirīya-Prātiśākhya* is attached to the *Taittirīya* school of the Black *Yajurveda*. The *Vājasaneyi-Prātiśākhya* is attached to the White *Yajurveda*. A text called the *Bhāṣika-sūtra* deals with the recitation of the late Vedic prose text of the *Śatapatha-Brāhmaṇa* belonging to the tradition of the White *Yajurveda*. There are five texts which fall into the general category of the *Prātiśākhyas* of the *Sāmaveda*. Of these five texts, only the *Ṛktantra* deals with the general discussion of phonetics. There are two texts, namely, the *Atharva-Prātiśākhya* and the *Śaunakīyā Caturādhyāyikā*, associated with the Śaunakīya school of the *Atharvaveda*. The exact dating of the *Śikṣās* and the *Prātiśākhyas* has been a topic of longstanding debate. In general, one can say that the existing *Śikṣās* seem to be 'all of them, young, elaborations of the definitions laid down in the *Prātiśākhyas*' (Thieme 1935: 85–86). The existing *Prātiśākhyas* themselves seem to have old and new textual layers in them, some predating the grammarian Pāṇini (around 500 BC), others reflecting post-Pāṇinian developments.

4. Formation of the Sanskrit Alphabet

Referred to by the term *akṣara-samāmnāya* 'collective statement of sounds,' an ordered Sanskrit alphabet came into existence by the time the late Vedic literature (about 700 BC) was produced. A distinction beween vowels and consonants was already made. The consonants were generally divided into three categories, *sparśa* 'contact sounds,' *antaḥsthā* 'in-between sounds,' and *ūṣman* 'aspiration sounds.' The first category included stops and nasals, the second category included semivowels, and the third category included spirants. A further amplification resulted in the following generally accepted alphabet (2):

Vowels:

a ā i ī u ū ṛ ṝ ḷ e o ai au (2)

Consonants:

sparśa:				
k	kh	g	gh	ṅ
c	ch	j	jh	ñ
ṭ	ṭh	ḍ	ḍh	ṇ
t	th	d	dh	n
p	ph	b	bh	m
antaḥsthā:				
y	r	l	v	
ūṣman				
ś	ṣ	s	h	

Additional sounds:

anusvāra	ṃ
visarga	ḥ
jihvāmūlīya	ẖ (before k, kh)
upadhmānīya	ḫ (before p, ph)

The above alphabet is accepted with minor differences by all the *Śikṣās* and *Prātiśākhyas*. The alphabet shows a tacit awareness of several features of sounds, and a certain ordering of those features. The vowels are grouped into several subgroups. The first group is represented by the vowels *a*, *ā*, *i*, *ī*, *u*, and *ū*. These are the basic simple vowels. They are ordered back-to-front in terms of their points of articulation, i.e., throat (*kaṇṭha*), palate (*tālu*), and lips (*oṣṭha*). To these basic simple vowels are added the vocalic *ṛ*, *ṝ*, *ḷ* (and *ḹ* for some traditions). All these together beginning with *a* are called *samāna* 'simple vowels.' They are grouped into pairs of short and long vowels, and each pair is often subsumed under a common generalization called *varṇa*, for example, the vowels *a* and *ā* belong to the family or type designated by the term *a-varṇa*. After the simple vowels comes the group of four vowels, *e*, *o*, *ai*, and *au*. These four are generally called *sandhyakṣara* 'compound vowels.' Out of these four, the first two are often, though not always, described as monophthongs, while the latter two are most often explicitly called *dvi-varṇa* 'consisting of two sounds,' that is, diphthongs. The principle of back-to-front ordering in terms of the points of articulation is maintained even in the subgroups *e*, *o*, and *ai*, *au*. In the category of sounds called *sparśa* 'contact sounds,' that is, stops and nasals, several converging principles are at work. The five horizontal groups are each called a *varga* 'group,' that is, *k(a)-varga*, *c(a)-varga*, *ṭ(a)-varga*, *t(a)-varga*, and *p(a)-varga*. The vertical ordering of these groups shows the same back-to-front ordering, with the *k(a)-varga* at the back end of the spectrum of points of articulation and the *p(a)-varga* at the front end of the same spectrum. The palatal, the retroflex, and the dental groups are ordered between the velar and the labial groups. The vertical lines intersecting these five groups show other phonetic features. The first vertical group, *k*, *c*, *ṭ*, *t*, and *p*, consists of voiceless unaspirated stops. The second vertical group, *kh*, *ch*, *ṭh*, *th*, and *ph*, consists of voiceless aspirated stops. The third vertical group, *g*, *j*, *ḍ*, *d*, and *b*, consists of voiced unaspirated stops. The fourth vertical group, *gh*, *jh*, *ḍh*, *dh*, and *bh*, consists of voiced aspirated stops. The fifth vertical group, *ṅ*, *ñ*, *ṇ*, *n*, and *m*, consists of nasals. The order of consonants in each of the five horizontal groups of stops and nasals is significant for other theoretical reasons as well. Deshpande (1976) shows that there were theorists who reduced the total number of primitive sounds to a much smaller number and argued that other Sanskrit sounds were built by combining these primitive sounds. Thus, for instance, in the series *k*, *kh*, *g*, *gh*, and *ṅ*, the first consonant *k* is deemed to be a primitive consonant. By adding the voiceless velar aspiration, *ẖ* (*jihvāmūlīya*), to the primitive *k*, one derives the voiceless aspirate stop *kh*. It is important to note that the aspirated stops are called *soṣman* 'fused with a spirant' in Sanskrit, indicating their compound nature in terms of these early phonetic theories. Similarly, the sound *g* is derived by adding the primitive voice (*ghoṣa*) *a* to the primitive consonant *k*. Thus, naturally, the category of voiced consonants is called *ghoṣavat* 'with voice,' indicating that the feature of voice is also looked at as an add-on feature. The sound *gh* is derived by adding the voiced aspiration *h* to *k*. The final nasal of the series, *ṅ*, is derived by adding the primitive voiced nasal *ṃ* (*anusvāra*) to the primitive consonant *k*. Thus, the order of these consonants represents the results of prior theoretical considerations which are explicitly discussed in texts like the *Ṛgveda-Prātiśākhya* (cf. Deshpande 1976).

After these 'contact' sounds, the alphabet lists the semivowels or 'in-between sounds' (*antasthā/antaḥsthā*), *y*, *r*, *l*, and *v*. At the very end are listed the spirants, *ūṣman* 'aspiration sounds,' *ś*, *ṣ*, *s*, and *h*. The semivowels, *y*, *r*, *l*, and *v*, as well as the three sibilants, *ś*, *ṣ*, and *s*, also exhibit the back-to-front ordering in terms of the points of articulations of the included sounds. It seems that the phoneticians intended the final *h* as a separate addition to the first three sibilants. The first three are voiceless sibilants, while the final *h*, is a voiced aspiration. Most texts also add the sounds *ṃ*, *ḥ*, *ẖ*, and *ḫ*. Among these sounds, *ḥ* (*visarga*) is a voiceless *h* sound. The sounds *ẖ* (*jihvāmūlīya*) and *ḫ* (*upadhmānīya*) are variants for *ḥ*, before *k*, *kh*, and *p*, *ph*, respectively. The nature of the sound represented by *ṃ*, the *anusvāra*, is highly debated in the ancient texts. The general consensus is that it is an oral–nasal generic sound which changes to a homorganic nasal in accordance with what follows. An unchanged or unchangeable *ṃ* is found only before the spirants and *r*. This predominant context of spirants for the *anusvāra* led some texts like the *Ṛgveda-Prātiśākhya* to include this sound in its list of spirants (*ūṣman*). Since there was a feeling that an *anusvāra* could be prolonged in length in recitation, the same text says that an *anusvāra* may be considered to be either a vowel or a consonant. Most of these texts discuss several other sounds and their features. Besides the *ṃ* (*anusvāra*), which is generally described as an oral–nasal sound, most texts also posit another sound called *nāsikya*, which is deemed to be a pure nasal sound. Additionally, most texts talk about fractional vowels, such as the ones which go into the make-up of a vowel normally represented as *ṛ*, i.e., *ərə*. The phonetic treatises also go into details of what are clearly transitional sounds. For instance, the texts talk about a nasal *g̃* (=*ŋ*?) intervening between the consonants *g* and *n* in a word like *agni*. Such consonants are called *yama*. The texts also go into details of accents (pitch variation) and nasalization of vowels, as well as three- and four-moraic vowels. According to these texts, one can also get contextual nasal variants for all vowels, and the semivowels *y*, *v*, and *l*, that is, *ỹ*, *ṽ*, and *l̃*.

5. Descriptive Techniques and Terminology

The descriptive and the prescriptive goal of the ancient Indian phonetic tradition was to be able to distinguish clearly between different sounds of Sanskrit, so that one would not be mistaken or mispronounced for another. Verse 10 of the *Pāṇinīya-śikṣā* says: 'Sounds are distinguished from each other on the basis of accents (*svara*), time or duration (*kāla*), point of articulation (*sthāna*), manner (*prayatna*), and type of phonation (*anupradāna*).' Here, the term *svara* 'accent' refers to the pitch distinctions denoted by the terms *udātta* 'high,' *anudātta* 'low,' and *svarita* 'rising-falling.' The term *kāla* 'duration' refers to units of time required to pronounce a given sound. Consonants are generally considered to be of a half-mora (*ardhamātrā*) length, while vowels can be of one, two, three, or four morae in length. The one-mora vowels are called *hrasva* 'short.' The two-mora vowels are called *dīrgha* 'long.' Vowels with three- or four-morae length are called *pluta* 'prolonged.' The term *sthāna* 'place, point of articulation' refers to points on the articulatory track, that is, *uras* 'chest,' *kaṇṭha* 'throat,' *jihvāmūla* 'tongue-root,' *tālu* 'hard palate,' *mūrdhan* 'cerebrum, roof of the oral cavity,' *dantamūla* 'alveolar ridge, root of teeth,' *danta* 'teeth,' and *oṣṭha* 'lips.' The list of points of articulation sometimes also includes *nāsikā* 'nose.' The term *prayatna* 'manner' refers to how the physical organ called *karaṇa* 'articulator' relates to the point of articulation, that is, *sparśa* 'contact,' *upasaṃhāra* 'approximation,' *vivṛta* 'open,' etc. The term *karaṇa* 'articulator' generally refers to different parts of the tongue, such as the tip, the middle, and the root, as well as the sides or edges, and the middle. It also refers to teeth in the case of labiodental sounds like *v*, and to the lower lip in the case of labial sounds like *b*. For nasalized vowels such as *ã*, *ĩ*, *ũ*, *ẽ*, and *õ*, the nose is often considered to be an articulator, while for the nasal consonants *ṅ*, *ñ*, *ṇ*, *n*, and *m*, the nose is considered to be a point of articulation (cf. Deshpande 1975: 11–12). The texts show a great diversity of opinion on many of these classifications (cf. Allen 1953; Bare 1976). The final category is that of *anupradāna* 'phonation, emission.' Generally, there are two types of emission, that is, *śvāsa* 'breath' and *nāda* 'resonance,' resulting from two different positions of the glottal chords, *vivṛta* 'open' and *saṃvṛta* 'close' respectively. The emission of the type of breath further results in voiceless sounds, while the emission of the type of resonance further results in vowels and voiced consonants. Some texts, like the *Taittirīya-Prātiśākhya*, claim that there is a third type of emission called *hakāra*, 'the *h* sound, voiced aspiration,' when the glottal chords are in a position between open and close, and this type combines voice or resonance with aspiration and is termed 'breathy voice' in modern phonetics. This type of emission is found in the voiced spirant *h*, as well as in voiced aspirate stops such as *gh*, *jh*, *ḍh*, *dh*, and *bh*. The ancient Indian texts use two different terms, *nāda* and *ghoṣa*, to refer to voicing. The feature of *nāda* is often said to be shared by vowels and *ghoṣavat* consonants, that is, consonants possessed of *ghoṣa*, voiced consonants. Modern scholars have debated the question of whether or not this refers to two different types of resonance, the first, *nāda*, produced by the closure of the glottal chords, and the secondary amplification, *ghoṣa*, produced by a closure in the oral chamber created by the contact between the articulator and the point of articulation (cf. Deshpande 1976; Cardona 1983).

Certain features are considered as plus/minus features in ancient Indian phonetics, while others are considered as more/less features. The terms *ghoṣavat* (voiced) and *aghoṣa* (voiceless) indicate that the feature of *ghoṣa* 'voice' is a plus/minus feature. On the other hand, the feature of aspiration, especially when designated by the term *prāṇa*, appears as a more/less feature. The sounds which are called unaspirated in western terminology are called *alpa-prāṇa* 'with less *prāṇa*,' while the aspirated sounds are called *mahāprāṇa* 'with greater *prāṇa*.' Similarly, the notion of *prayatna* 'effort, manner' is expressed in some texts in binary terms, *spṛṣṭa*/*aspṛṣṭa* 'with or without contact between the articulator and the point of articulation,' while in other texts this notion is expressed in terms of degrees of openness and contact, that is, *vivṛta* 'open,' *īṣadvivṛta* 'slightly open,' *vivṛtatara* 'more open,' and *vivṛtatama* 'most open,' *spṛṣṭa* 'in contact,' and *īṣatspṛṣṭa* 'in slight contact.'

6. Phonetics and Phonology in Ancient India

This is a very important topic, and many modern scholars have devoted their attention to a possible distinction between phonetics and phonology in the context of the ancient traditions of Sanskrit phonetics and grammar (cf. Deshpande 1975; Bare 1976; Cardona 1983). Often, the term *varṇa* is translated by the term 'phoneme' in modern expositions of Sanskrit phonetics. The Sanskrit grammarians do indeed discuss minimal pairs like *kūpa*/*sūpa*/*yūpa*. However, the term *varṇa* does not strictly refer to a phoneme in modern linguistics. For Sanskrit phoneticians, the sounds *n* and *ñ* are distinct *varṇas*, while they would be only allophones for a modern linguist. On the contrary, the sounds *a* and *ā* would be separate phonemes for a modern linguist, but they belong to the same *varṇa* for Sanskrit phoneticians and grammarians. Some modern analyses would represent the distinction between *a*/*ā* as the phoneme *a* ± prosody of length. On the other hand, the Sanskrit phoneticians and grammarians do indeed have a notion that certain features of sounds are relevant in some descriptive contexts, while they are not relevant in other contexts. Consider the terms *avarṇa* and *akāra*. According to the fully developed phonetico–grammatical doctrines of Sanskrit grammarians, the first term refers to the whole family of the following 18 sounds:

a ā ā3 á ā́ ā́3 à ā̀ ā̀3 ã ā̃ ā̃3 ã́ ā̃́ ā̃́3 ã̀ ā̃̀ ā̃̀3

The distinctions of length, accent, and nasality are not relevant for inclusion in a *varṇa*. On the other hand, the term *akāra* refers to the six tokens of short *a* differing in accent and nasality, but not in length. The grammarian-phoneticians knew that in formulating some rules of sandhi, they could achieve the maximum descriptive economy by resorting to the *varṇa* groupings, while for other rules, the *-kāra* grouping seemed more economical, and for still other rules, one needed to make a highly specific reference to a token with a specific length, nasality, accent, etc. The grammarian-phoneticians make several important distinctions in their terminology. For instance, two sound tokens are *sarūpa* 'with identical phonetic shape,' if and only if they have all identical phonetic features, including length, nasality, accents, etc. Two vowel-tokens are grouped in the same *x-kāra* group, if they have the same point of articulation, articulator, manner, and quantity. They could differ in nasality and accent, and still be part of the same *x-kāra* group. Two sounds are *savarṇa* 'homogeneous' with each other if they share the same point of articulation and the same manner. These different groupings were used to formulate different rules in Sanskrit grammar, and allowed descriptive optimization. The notion of maximal featural proximity (*āntaratamya*) is one of the principles used in Sanskrit grammar to determine the choice of a substitute from among several alternatives (cf. Bare 1976).

The Sanskrit grammarian-phoneticians were also aware of another distinction, that of the speed of delivery or tempo, that is, fast, medium, and slow. These different modes of delivery were considered to be appropriate for different contexts, but these differences had no grammatical value. Further, they noticed that a consonant such as *k* seemed to acquire a certain degree of voicing in intervocalic positions, but that it was not to be distinguished from the generic *k* for all practical purposes. Thus, on the whole, the tradition of Sanskrit phonetics was a highly developed and sophisticated tradition, and its discovery by the west led to further advances in the development of the Western tradition of linguistics in the nineteenth century (cf. Whitney 1866; Allen 1953).

Bibliography

Allen W S 1953 *Phonetics in Ancient India*. London Oriental Series 1. Oxford University Press, Oxford

Bare J 1976 *Phonetics and Phonology in Pāṇini*. Natural Language Studies, no 21. Phonetics Laboratory, University of Michigan, Ann Arbor, Michigan

Cardona G 1983 Phonetics and phonological rules in grammars. In: *Linguistic Analysis and Some Indian Traditions*. Bhandarkar Oriental Research Institute, Poona

Deshpande M M 1975 *Critical Studies in Indian Grammarians I: The Theory of Homogeneity [Sāvarṇya]*, The Michigan Series in South and Southeast Asian Languages and Linguistics, no. 2. Center for South and Southeast Asian Studies, University of Michigan, Ann Arbor, Michigan

Deshpande M M 1976 On the Ṛk-Prātiśākhya 13.5–6. *Indian Linguistics* **37**: 171–81

Deshpande M M 1979 Genesis of Ṛgvedic retroflexion: A historical and sociolinguistic investigation. In: Deshpande M M, Hook P E (eds.) *Aryan and Non-Aryan in India*. Center for South and Southeast Asian Studies, University of Michigan, Ann Arbor, Michigan

Thieme P 1935 *Pāṇini and the Veda: Studies in the Early History of Linguistic Science in India.* Globe Press, Allahabad
Thieme P 1985 The first verse of the *Triṣaptīyam* (AV, Ś 1.1–AV, P 1.6) and the beginnings of Sanskrit linguistics. *Journal of the American Oriental Society* **105**: 559–65
Varma S 1929 *Critical Studies in the Phonetic Observations of Indian Grammarians.* The Royal Asiatic Society, London (Indian reprint edn. 1961, Delhi)
Whitney W D 1866 On Lepsius's standard alphabet: A letter of explanations from Professor Lepsius, with notes by W D Whitney. *Journal of the American Oriental Society* **8**: 335–73

Tamil Linguistic Tradition

Kamil V. Zvelebil

Tamil is a Dravidian (and not an Indo-European) language, spoken mainly in southern India and Sri Lanka. The Tamils have developed an ancient and vigorous linguistic tradition of their own, with particular stress on the notion of 'correctness': the 'correct' variety of Tamil is that which follows the traditional, prescriptive linguistic norms of grammar. The standards of this correctness for Tamil (termed *centamiḻ*) are best formulated in ancient and medieval grammars like *Tolkāppiyam* and *Naṉṉūl.*

The very beginnings of Tamil linguistic tradition are lost in the legendary accounts of the semimythical sage Akattiyaṉ (Sanskrit Agastya) who is said to have learnt Tamil from the god Śiva, taught it to his twelve disciples, one of whom was the author of *Tolkāppiyam,* and himself composed a huge fivefold grammar of Tamil, the *Akattiyam* (the first mention of this grammar is however in a commentary dated as late as around 700 AD). The fragments of this treatise which are still available today are almost certainly forgeries.

Nevertheless, from very early times, there must have been enormous learned activity in the field of Tamil grammatical description, and in the related fields of prosody, rhetoric and poetics, reaching back at least to the third century BC. Apparently, three or four different linguistic traditions existed even at that early stage: one was definitely that of *Tolkāppiyam*, the earliest grammar extant; another was probably that of the lost *Akattiyam,* connected with the Aintiram (Skt. *aindra-*) grammatical school. In addition, there was the trend which based itself on Sanskrit grammarians as models and attempted to introduce their linguistic categories into the quite different Dravidian structure of Tamil.

Civañāṉa Muṉivar (d.1785) coined the saying that as there was Pāṇini, the first great grammarian of Sanskrit, so there was Akattiyaṉ, who was the first to observe and describe systematically the linguistic properties of Tamil. It is possible that he was indeed the first to formulate the conception of Tamil as a 'triune' phenomenon (*muttamiḻ*; see below). Among the twelve disciples of Akattiyaṉ, a few are quasi-historical in that they are mentioned independently, and that various texts are ascribed to some among them.

The term for grammar, *ilakkaṇam* (Skt. *lakṣaṇa-*) can be rendered as 'marker'—literature is not 'words written' (Latin *litera*) but 'words marked' (*ilakkiyam*; Skt. *lakṣya-*) by the markers of grammar; but grammar is 'squeezed out' of literature like 'oil from sesamum seed.' The range of phenomena which come under the designation *ilakkaṇam* ('grammar') is however much broader than linguistic features alone. One could almost say that 'grammar' in the traditional Tamil sense covers any cultural and social phenomenon that is 'marked' (hence 'grammar of love,' 'grammar of dance,' etc.) and thus can undergo descriptive–prescriptive treatment. Language is just one such phenomenon.

The two characteristic conceptual features of indigenous Tamil linguistic tradition are the vision of the language as triune manifestation (*muttamiḻ*), and the notion of grammar as a fivefold hierarchically organized discipline (*aint'ilakkaṇam*). 'Threefold Tamil' refers to the language as verbal art manifested and realized in the three modes of textual (*iyal*), musical (*icai*) and representational (*kūttu, nāṭakam*) performance. In concrete terms, *iyal* refers to 'natural' speech as organized in poetry and prose, read or recited, *icai* to speech accompanied by musical sound (song), and *nāṭakam* to play, drama and dance. The earliest documented reference to *muttamiḻ* is probably to be found in *Muttoḷḷāyiram* 39.1 (end of sixth century–eighth/ninth century).

The hierarchic structure of grammar, as concretized in the 'fivefold' (*aivakai*) grammars (*ilakkaṇam*) is best symbolized by the following chart:

aṇi	figures of speech, tropes	rhetoric
|	|	|
yāppu	rhythm, metre	prosody
|	|	|
poruḷ	meaning	semantics
|	|	|
col	form: word and sentence	morphosyntax and lexicon
|	|	|
eḻuttu	sound and its written symbol	phonetics, phonemics, graphemics

The grammar *Tolkāppiyam* (meaning probably 'ancient composition') is the earliest known work of Tamil literature extant in its entirety. It is probably the result of protracted (possibly collective) composition from the first century BC to about 450–500 AD, and no doubt contains a number of interpolations and later additions to all of its three parts. The total number of aphorisms differs according to various editions from 1599 to 1611. They are in stanzaic form and vary in length from 1 line to 59 lines. Seven commentaries on the grammar are available.

Its first book, *Eḻuttatikāram*, in eight chapters deals roughly with phonetics, phonology, and morphophonology. The second book, *Collatikāram*, in nine chapters treats morphology and semantics, and the third book, *Poruḷatikāram*, deals with subject matter of literary compositions, conventions observed in handling content and form, and with prosody. The name of its author, Tolkāppiyar or Tolkāppiyaṉār, is evidently derived from the name of the book (although other interpretations have been suggested). According to tradition, he was a Jaina from Travancore, one of the disciples of Akattiyaṉ. Undoubtedly he had intimate knowledge of Sanskrit linguistic thought, but in most aspects he shows independent thinking on the nature and structure of Tamil and its culture. Although he does not reach Pāṇini's level of economy, consistency and terseness, the field of experience he describes is much wider and deeper. The work is definitely one of the finest monuments of human intelligence, and has exerted lasting influence on the Tamil mind.

The only ancient Tamil grammar written on the five traditional branches of the language (*aint'ilakkaṇam*) is *Vīracōḻiyam*, named after King Vīrarājendra (1063–69), by Puttamittiraṉ (Buddhamitra), obviously a Buddhist scholar. It shows strong partiality in favor of a far-reaching Sanskritization of Tamil linguistic structure. It also notices differences between written and spoken Tamil. The valuable commentary by Peruntēvaṉār (fl. early twelfth century), perhaps a friend and disciple of the author, cites a number of otherwise unknown works.

Pavaṇanti, a Jaina scholar, was the author of *Naṉṉūl* ('The Good Book'), ca.1200/05, which is no doubt the most distinguished and most popular grammar of literary, standard Tamil. Its authority is still valid for the written style of the language. Its 461 aphorisms deal with phonology, graphics, sandhi, word-classes and morphology. There are many commentaries, from Malaināṭar's (thirteenth century) to modern ones. It has also been translated into English several times; a critical edition was published in 1985.

The impact of the three great grammars, *Tolkāppiyam*, *Vīracōḻiyam*, and *Naṉṉūl*, was so powerful that the next generations of scholars satisfied themselves with composing innumerable more or less valuable commentaries and hyper-commentaries. It was only in the seventeenth and eighteenth centuries that new creative schools of linguistic description of Tamil emerged.

Perhaps the greatest among these scholars was Civañāṉa Muṉivar (ca.1725–85), a versatile Śaivite philosopher, controversialist, dialectician, commentator and poet. His writings are characterized by lucidity, logical forcefulness, biting humor and stinging sarcasm. His most important linguistic treatise is *Ilakkaṇaviḷakka cūṟāvaḷi* ('Whirlwind (against) *Ilakkaṇaviḷakkam*'). This polemic work is a sharp criticism of *Ilakkaṇa viḷakkam* ('The Illumination of Grammar') in 941 aphorisms based on Pavaṇanti's *Naṉṉūl*, the work of Vaittiyanāta Tēcikar (seventeenth century) of Tiruvārūr. Written for his students, who were children of his patron, it covers the entire range of Tamil grammar, but shows a strong pro-Sanskritic bias. Civañāṉa Muṉivar, although himself a great Sanskrit scholar, upheld the validity of Tamil grammatical tradition and argued against some overbearing Sanskrit enthusiasts who claimed that Tamil is dependent on, and inferior to, Sanskrit. He also wrote a revision of Caṅkaranamacivāyar's (fl. early eighteenth century) biased commentary on *Naṉṉūl* (published by Āṟumuka Nāvalar in 1851).

A group of Tamil grammarians connected mostly with Śaiva monasteries of Tiruvāvaṭuturai and Tarumapuram, showed the tendency to introduce Sanskrit categories into Tamil grammatical description. Most important among them were Vaittiyanāta Tēcikar, mentioned above, and his son Cuvāminātа Tēcikar (fl. late seventeenth century). Vaittiyanāta Tēcikar was one of the great Tamil scholars and poets of the seventeenth and eighteenth centuries. His *Ilakkaṇa viḷakkam* became immensely popular under the title *Kuṭṭittolkāppiyam* ('Little *Tolkāppiyam*'), published in three chapters, each chapter in five parts; an introduction to this work, and possibly some of its later parts, were composed by his son Catāciva Tēcikar. Cuvāminātа Tēcikar was the author of *Ilakkaṇakkottu*, a Tamil grammar in three chapters consisting of 151 aphorisms in metre with gloss in prose.

A reform of traditional linguistic usage was the work of *Āṟumuka Nāvalar* (1822–79) who edited and published a large number of ancient grammatical texts and commentaries, but who also adopted the use of modern punctuation marks in Tamil prose, and abolished some complicated sandhi rules.

In reviewing the first half of the twentieth century, four scholars should at least briefly be mentioned: S. Vaiyāpuri Piḷḷai, R. P. Sethu Piḷḷai, T. P. Mīṉāṭcicuntaram, and M. Varatarācaṉ. Each of them was responsible for certain trends and developments in Tamil linguistic thought in modern times.

S. Vaiyapuri Piḷḷai's (1891–1956) greatest achievement was probably his able editorship (1926–36) of the magnificent *Tamil Lexicon* with its 104,405 entries. Characteristic for him was his opposition to linguistic purism, advocacy of the need of knowledge of Sanskrit and its relationship to Tamil, a passion for critical attitudes and freedom from linguistic and other prejudices.

The interests of R. P. Sethu Piḷḷai (1886–1961) lay mostly in the fields of semantics (*Words and Their Significance*, Madras, 1953) and onomastics, particularly of place-names (*Tamiḻakam–ūrum pērum*, Madras, 1946, 1950, 1956). He was also one of the first to be keenly aware of the diglossic situation in Tamil (*Tamil—Literary and Colloquial*, Madras, 1937).

Very important work on the Tamil Language from the historical perspective appeared in 1965: T. P. Meenakshisundaran's (1901–80) *A History of Tamil Language*. He also attacked linguistic purism and cultural chauvinism, pleading for the important role of English and showing keen interest even in Hindi.

M. Varadarajan (1912–74) coined modern Tamil linguistic terminology, and introduced into Tamil scholarship very modern and recent theories of descriptive and historical linguistics (*Moḻinūl*, 1947, a textbook of linguistics; *Eḻuttiṉ katai*, 1952, on the evolution of script; *Moḻiyiyaṟ kaṭṭuraikaḷ*, 1954, essays on Tamil grammar; *Moḻivaralāṟu*, 1954, on historical linguistics). On matters of general linguistic attitude, he tended rather towards moderate Tamil purism.

The ideological strife concerning usage has remained unresolved. There are two main schools of thought in contemporary Tamil linguistic usage. One is reasonably 'open,' traditionally closer to Sanskritic models, in which there is a willingness to admit that English and even Hindi have to play an important role in contemporary Tamil culture and society; the other trend is rather 'closed,' basing linguistic usage strictly on the indigenous 'pure' Tamil tradition, and inimical to any perceived foreign influences (mainly to the pressures of Hindi). At the present moment, it would seem that this second trend is gaining ground.

Bibliography

Albert D 1985 *Tolkāppiyam—Phonology and Morphology*. International Institute of Tamil Studies, Madras (English transl.)

Meenakshisundaran T P 1965 *A History of Tamil Language*. Deccan College Postgraduate and Research Institute, Poona

Rajam V S 1992 *A Reference Grammar of Classical Tamil Poetry*. American Philosophical Society, Philadelphia, Pennsylvania (150 BC to pre-fifth/sixth century AD)

Subrahmanya Sastri P S 1934 History of grammatical theories in Tamil and their relation to the grammatical literature in Sanskrit. *Journal of Oriental Research*.

Vijayavenugopal G 1968 *A Modern Evaluation of Naṉṉūl* (*eḻuttatikāram*). Annamalai University, Annamalainagar

Zvelebil K V 1992 *Companion Studies to the History of Tamil Literature*. Brill, Leiden (See ch. 5 and appendix 3)

Zvelebil K V 1995 *Lexicon of Tamil Literature*. Brill, Leiden (See pp.13–16, 705–709)

SECTION V

Antiquity — Europe

SECTION V

Antiquity — Europe

Classical Linguistics: An Overview

Daniel J. Taylor

Call it what we will—linguistics, language science, grammar, or whatever—the formal study of language qua language, like most other Western intellectual enterprises, originates in ancient Greece and is transformed and transmitted to the modern world by the Romans. Among the noteworthy achievements of that collective endeavor we may cite the following: invention of the alphabet as we know it, i.e., with vowels obligatorily included therein; identification of sentence-types or illocutionary forces; formal introduction and widespread usage of the four transformations (addition, deletion, substitution, permutation); creation and elaboration of literally scores of grammatical terms (and, a priori, the discovery of the phenomena to which they refer) still in current use today, usually via Latin calques of the original Greek names; carefully articulated definitions of the parts of speech; serious and sometimes profound reflections on the arbitrariness of language and the relationships between *signifiant* and *signifiée*; meticulous descriptions of accidence, including the declensions and conjugations so familiar even to today's students of Latin; publication and wide dissemination of linguistic knowledge, especially for purposes of education, via grammatical sketches (*technai*) and, later, grammatical tomes (*artes grammaticae*); and in general the conscious acknowledgment of grammar's central and ubiquitous role in intellectual activity, of the scientific rigor of linguistic exegesis, and of the autonomy of language science. Clearly, modern linguistics owes much to its origins in classical antiquity.

1. Historiographical Problems

No survey can do justice to Graeco–Roman language science, but several well-written, informative accounts do describe and assess classical antiquity's major accomplishments in linguistics. Della Casa (1973), Pinborg (1975), Baratin & Desbordes (1981), Hovdhaugen (1982), Robins (1990), and Schmitter (1991) are available and preferable to nineteenth-century volumes, e.g., Lersch (1838–41) and Steinthal (1890–91). These surveys chart the course of classical linguistics in disparate fashions, depending in large part on how their authors confront several serious historiographical problems, in particular the lamentable loss of so much of the ancient grammatical literature. Not a single Stoic linguistic treatise is extant; thus our knowledge of Stoic language science unfortunately derives from sources that are late, polemical, or confused. Only one Alexandrian grammatical manual is extant, but both its dating and authorship have been called into question for centuries. Almost all of Varro's voluminous grammatical corpus and all but fragments of Palaemon's are lost. The plethora of references in the extant Roman *artes* to grammars and grammarians otherwise unknown and/or lost suggests that we are missing as many as, if not more than, we actually possess.

These vast lacunae in our knowledge, together with the sometimes idiosyncratic nature of the texts which are extant, have engendered an equally vast *horror vacui* on the part of some historiographers, who as a consequence have tended to ascribe various notions and developments to non-existent texts and anonymous authors. Similarly, despite the dearth of textual evidence, received opinion has postulated a series of dichotomies—nature and convention, analogy and anomaly, philosophical and technical grammar—which supposedly capture the overall theoretical thrusts of ancient language science and therefore provide linkages between extant and lost texts but which in fact only skew the results of more sober inquiries. More recent historiography has been content to limit itself to the extant texts per se, to refrain from ascribing weighty generalizations to texts too limited to support them (and, *de facto*, to discredit such generalizations), and, in view of the lack of evidence to the contrary, to assume that the history of ancient linguistic thought is in general a discontinuous one. However episodic such accounts may be, they are at least faithful to the historical record.

Other caveats are equally compelling. Linguistic information can be found in almost any text, for the ancients do not compartmentalize knowledge as we do. Philosophers, logicians, rhetoricians, poets, historians, philologists, and literary critics, as well as bona fide grammarians contribute to formulating ancient language science. Likewise, Greeks and Romans do not always broker out linguistic phenomena in ways familiar to modern readers; syntactic information, for example, is rarely if ever specifically labeled as such. The technical terminology which we take for granted, thanks to the ancients, is in antiquity evolving and does not become fixed until late in the tradition; linguistic theories and practices are therefore often couched in the language of everyday intellectual discourse rather than in an established metalanguage. With such caveats in mind and with a proper grasp of the historiographical problems cited above, however, the contemporary reader can essay both the ancient texts and the secondary literature with profit and can thereby come to grips with what the Greeks and Romans have to say about language science. Indeed, since grammar ranks as one of the major intellectual legacies bequeathed to us by classical antiquity, its ancient history provides remarkable insights into the Western world's earliest attempts to describe scientifically and to study formally what is uniquely human, namely, language. To that end it is perhaps even incumbent upon us to seek to understand Graeco–Roman language science as best we can, for not only do we find striking anticipations of and parallels with later, even modern, linguistic theories and practices as well as the classical foundations of most subsequent language science but we also encounter equally striking differences in both intellectual attitudes and approaches to the analysis of linguistic phenomena.

2. From the Origins to Plato and Aristotle

The Homeric poems are paradigmatic examples of orally composed, formulaic poetry, and neither the *Iliad* nor the *Odyssey* contains a single unambiguous reference to writing. Yet the processes of committing the poems to writing and of importing and adapting the Semitic alphabet to the phonetic exigencies of the Greek language coexist in a not yet fully understood symbiotic relationship. Together the two processes establish the foundations of language science in Greek antiquity, and consequently literature enjoys forever a privileged status in the scientific study of language. As Greek literature proliferates, fifth-century Greeks consciously focus on matters of dialectology, metrics, and error analysis, e.g., barbarisms (errors in morphology) and solecisms (syntactic mistakes). Taxonomy is initiated by the intellectually shadowy figure of Protagoras, who distinguishes four sentence types—wish/prayer, question, answer, command—three genders, three numbers, and probably the four *pathē* or transformations. Socrates successfully confronts the dichotomy between the existential and the equational functions of the copula and, less successfully, the arbitrariness of the sign (most notably in the *Cratylus*). Other grammatical notions, e.g., dual patterning and both polygenetic and monogenetic theories on the origin of language(s), and terms, e.g., *ptōsis* ('inflected form,' later 'case') are also out and about in the fifth century.

Plato attests to phonological analysis and classification and establishes once and for all the roles of NP and VP in linguistic thought, though the key passage (*Sophist* 261D–263D) is vexing in the extreme. He begins by referring to *onomata* 'nouns' and *rhēmata* 'verbs' as individual entities but then abruptly treats them in combination as necessary sentential constituents, presumably therefore as 'subjects' and 'predicates'; yet nowhere does he employ *onoma* as 'subject' or *rhēma* as 'predicate.' Nonetheless, he has both defined noun and verb and postulated a fundamental, binary, syntactic structure which necessarily includes the former in one part and the latter in the other. So by the mid-fourth century grammatical knowledge is fairly extensive but also fairly eclectic.

Aristotle's précis in the *Poetics* is 'the first grammatical sketch of Greek known to us' (Hovdhaugen 1982: 33) and reprises much of the information we glean from Plato but attempts to systematize it somewhat. Letters, for example, are divided into vowels, semivowels, and consonants (mutes), with aspirated stops being so designated for the first time. After the letter, Aristotle defines and ever so briefly describes syllable, conjunction, article, noun, verb, cases (inflected forms of both nouns and verbs), and discourse or speech. Implicit are the hierarchical arrangement of linguistic items (letters, syllables, words, sentences); an embryonic accounting of the parts of speech (though, conspicuously, Aristotle does not use that term); a likewise embryonic account of nominal and verbal accidence; and an organizational scheme that ultimately becomes traditional. Aristotle includes the feature −tense in his definition of noun and +tense in that of the verb, defines metaphor as a semantic *analogia* 'proportion, analogy,' and elsewhere provides us with a fairly sophisticated treatment of what passes for syntax throughout most ancient linguistics, namely, the analysis of solecisms. Aristotle branches out on his own by formulating more precise definitions of noun and verb and better developed notions of subject and predicate. His list of ten predicate-types is as exhaustive as it is ignored by later grammarians. His formular analysis of predicates may not be unrelated to his four parts of speech, for an

Aristotelian categorical syllogism essentially requires only nouns, articles, verbs, and conjunctions (his grab-bag category including logical connectors). And Aristotle's remarks on innateness not only refine his predecessors' (cf. the famous experiment by the Egyptian king Psammetichus as recorded by Herodotus) but also strikingly anticipate modern theories which postulate a universal mental language common to all humankind.

3. Stoic and Alexandrian Grammar

Hellenistic linguistics (third–first centuries BC) is essentially either Stoic or Alexandrian, and it would be hard to underestimate the importance of either. Since linguistics is propaedeutic to the study of both Stoic logic and Alexandrian literary criticism, the purposes and procedures of the two Hellenistic versions of language science differ so widely as to be virtually incompatible with one another.

Stoic epistemology is divided into dialectic or logic and rhetoric, and the former is likewise divided into the study of *phōnē* 'sound' and *to sēmainomenon* 'the being signified.' Stoic language science is therefore properly defined as the relationship between sound and meaning, but the division of linguistic topics studied under the two rubrics is unfamiliar to us moderns. Under *phōnē* Stoics study sounds, letters, parts of speech, barbarisms, solecisms, poetic diction, verbal ambiguities, euphony, and music; under *to sēmainomenon* they study case, voice, mood, and—most significantly—*lekta*, literally 'sayables.' The study of the latter receives demonstrably more emphasis than that of the former within the Stoic scheme of things. The Stoics define sound as corporeal, add the feature ±case to definitions of parts of speech, distinguish common from proper nouns, add articles and perhaps even adverbs to the list of parts of speech, and markedly increase the technical terminology of grammatical inquiry. The increase in the number of parts of speech is due to the Stoic emphasis on logic and *lekta* rather than to any cumulative process or more refined taxonomic analysis. Exactly where and how they treat their most insightful and most sophisticated linguistic analysis, namely, that of the Greek verb with its distinction between aspect and tense, is not ours to know, but its significance is indubitable. Stoics distinguish sound (the thing signifying) from referent (the thing existing), both of which are corporeal, but also posit the existence of a third thing (the thing signified), i.e., the *lekton*, which is incorporeal. Therefore what modern linguistics treats as a dichotomy is in Stoic linguistics a trichotomy. Even so, however, the basic concepts are quite modern: referents aside, logicians often distinguish declarative statements, which can be written or spoken and read or heard even in different languages, from propositions, which are what the statements mean or express and which are, consequently, not physical entities. Given such a distinction, it is reasonable for Stoics to subsume parts of speech under *phōnē* but cases under *to sēmainomenon.*

Lekta are either complete or incomplete. The former include yes–no questions, questions requiring a declarative response, commands, oaths, etc., and what is far and away the most significant class, propositions (*axiōmata*), which can be affirmed or denied. Our sources discuss the several types of *axiōmata* at length. Thus Stoic logic is propositional logic, and Stoic syntax is the syntax of propositions. Under incomplete or deficient *lekta* the Stoics analyze predicates with much precision, distinguishing clearly and unambiguously in both terminology and conception between *katēgorēma* 'predicate' and *rhēma* 'verb.' The former is incorporeal, the latter corporeal, and they are thus treated under *to sēmainomenon* and *phōnē* respectively; we see a remarkable consistency in the structure and terminology of Stoic logico–linguistic thought. Curiously, however, no text accords equal time to subjects or analyzes them as incomplete *lekta* as we might expect.

Alexandrian scholars are not interested in abstract reasoning but, rather, in the concrete, in texts that are readable (or not, as the case may be) and, if poetic, metrical; they are first and foremost philologists and textual critics. Aristophanes' (of Byzantium) editions of the *Iliad* and *Odyssey* are epoch-making, but even they are improved by Aristarchus, who introduces both critical symbols (for indicating doubts about the authenticity, repetition, or order of verses) and respect for the authority of manuscript traditions into the history of scholarship. Alexandrian scholarship includes lexicographical treatises, commentaries, etc., all intended to enhance and facilitate the reading of the now critically edited texts of classical Greece's monumental authors. Though no textbooks are extant, evidence suggests that the educational curriculum is more grammatical and literary than it has ever been.

The grammatical knowledge requisite for such critical editions and ancillary texts is vast, but whether that knowledge is ever pursued for its own sake is an issue still *sub iudice*. Aristophanes supposedly authors a treatise entitled *Peri Analogias* and adduces five principles, to which Aristarchus adds a sixth, for determining analogy, and so some scholars would argue that the Alexandrians actually formulate rules for inflection, declensional and conjugational affiliations, paradigms, and so forth. No extant text contains anything of the sort, however, and the criteria for analogy make more sense if understood as criteria for emending texts rather than for classifying words into inflectional sets. As Aristotle uses *analogia* as a means of identifying and defining metaphor, so the Alexandrians employ it as a heuristic procedure for correcting poorly transmitted manuscripts. Analogy in that sense allows the Alexandrians to base their interpretations firmly on the text rather than to indulge in the allegorical interpretations characteristic of the Stoa. No Hellenistic text or fragment, grammatical or otherwise, even remotely suggests that the Alexandrians are engaged in any sort of analogy/anomaly quarrel with the Stoics. Nonetheless, the scope of grammatical inquiry has obviously been dramatically extended by the Alexandrians in their drive to edit and comprehend literary texts, but unfortunately the one extant grammatical *Technē* that purportedly summarizes the Alexandrian accomplishments in language science raises more questions than it answers.

Both the authorship and the dating of the *Technē Grammatikē* have been in doubt for centuries (see Di Benedetto 1958–59 and 1973). Whether it is the work of Dionysius Thrax, either wholly or partially, is moot and may well be beside the point, for the contents of the slim work are hardly exceptional. It begins as follows (translation from Kemp 1986):

> Grammar is the practical study of the normal usages of poets and prose writers. Its six divisions comprise: (1) skill in reading (aloud) with due attention to prosodic features; (2) interpretation, taking note of the tropes of literary composition found in the text; (3) the ready explanation of obscure words and historical references; (4) discovery of the origins of words; (5) a detailed account of regular patterns; (6) a critical assessment of poems; of all that the art includes this is the noblest part.

That much, at least, appears to be genuine, and Dionysius is clearly thinking of grammar in philological and literary terms. After four brief entries on the author's first division of grammar, the text abruptly switches to an analysis of letters and syllables and then, after defining word and sentence and enumerating eight parts of speech, proceeds to define and exemplify those parts of speech. None of the latter follows from any of the six divisions enumerated in the first paragraph unless the parts of speech are somehow to be understood as falling under the rubric of *analogias eklogismos*, the fifth division. The inconcinnity of contents can, of course, be accounted for by assuming that the introductory paragraphs are genuine and the remainder spurious.

The *Technē*'s eight parts of speech are: noun (the Stoic distinction between common and proper nouns is explicitly eschewed), verb, participle, article, pronoun, preposition, adverb, conjunction, and it is this list which becomes canonical. Unfettered by allegiance to either Aristotelian categorical or Stoic propositional syllogisms, Alexandrians can focus on the parts of speech (or, more properly, parts of the sentence) as reflected in normal literary discourse and therefore arrive at eight such items. Dionysius or whoever is addicted to semantic taxonomy, for he classifies nouns into 24 subtypes, adverbs into 26, and conjunctions into 8, all on the basis of meaning. Grammatical accidence receives its due, usually in a fairly skillful manner, and the plethora of grammatical terms is noteworthy: the tiny volume contains about 150 or so technical terms, which comprise almost the entire Western linguistic vocabulary until well into the twentieth century. The definitions of the parts of speech are an amalgam of the morphological, the semantic, and, at least implicitly, the syntactic, but they are sufficient and consequently endure for centuries without much elaboration or alteration.

In sum, Alexandrian scholarship raises textual and literary criticism and the linguistic issues attendant thereupon to new heights, and if grammar is not yet an autonomous intellectual endeavor, it is nearly so. Language science is equipped with a sufficient metalanguage, linguistic levels are clearly established (even if syntax still remains hidden in the dark domains of Stoic logic and/or solecisms), and the parameters of linguistic inquiry within phonology and morphology are well established. The word-class system of grammar dominates Alexandrian language science and carries over into the Roman world.

4. Linguistic Theory and Practice in Rome: Varro

As military, political, and economic power shifts westward to Rome in the late second and first centuries BC, so too does intellectual activity (cf. Rawson 1985). Romans are bilingual and consciously aware of their literary and linguistic debts to Greece. Latin literature bears witness to a deep-seated interest in things linguistic, but it is the visit of Crates of Mallos, a Stoic philosopher, to Rome in 168 BC or so that, anecdotally at least, precipitates the formal study of linguistics in Rome. Nonetheless, early Roman language science is decidedly Alexandrian in mode—editions of poetry, commentaries, etymological analyses, interpretations of hymns and legal documents, etc.—but also, as befits anything Roman, practical in purpose—orthography and spelling reform. Rome's first acknowledged philologist is Lucius Aelius Stilo (fl.100 BC), whose prize pupil Marcus Terentius Varro becomes Rome's most famous scholar (*vir Romanorum eruditissimus* according to Quintilian).

Varro's intellectual curiosity is all-consuming and his learning vast, but dearest to his scholarly soul is the Latin language. He authors almost a dozen major works on language science, but precious little remains of those works or of the dozens of other volumes he published. Only six of the original 25 books, i.e., chapters, of his *magnum opus*, the *De Lingua Latina*, remain, but they suffice to establish Varro as classical antiquity's premier linguistic theoretician. The work is eclectic in the extreme and combines Greek and Latin linguistic thought into a coherent Roman blend of language science. Within the extant portions of the *LL* Varro addresses etymology from a relatively scientific point of view; distinguishes, for the first time in ancient linguistic thought, between derivational and inflectional morphology; formulates the first embryonic declensions and conjugations in ancient language science; is the first and only ancient grammarian to apply abstract models to the articulation and solution of linguistic problems; creatively adapts the Stoic analysis of the Greek verb to the Latin verb system and in so doing becomes the only Latin grammarian prior to the Renaissance to recognize the future perfect indicative; and apparently even includes syntax in his account of the Latin language. By the end of Varro's scholarly career the *ars grammatica* is an autonomous and independent body of knowledge. Varro's books on syntax (fragments suggest that his syntax is Stoic, i.e., it deals with propositions) and on etymological theory are lost, but the three on etymological practice are a vast reservoir of cultural artifacts testifying to what educated Romans think about their own language. Lost also are the books on morphological practice, but the three extant ones on morphological theory are replete with penetrating observations on the nature of language and grammatical inquiry.

Varro's theory (cf. Taylor 1974) is word-based, and words are of two sorts, those which vary in form and those which do not. *Declinatio* 'morphological variation' is a linguistic universal and is likewise of two sorts, voluntary or natural; *declinatio voluntaria* is derivational morphology, and *declinatio naturalis* is inflectional morphology. How words vary inflectionally is determined by both their *figura* 'phonological form' and their *materia* 'grammatical substance,' and thus *similitudo* 'linguistic similarity' is a matter of both form and substance. The linguist's task is to identify *similitudo* wherever he can, and *analogia* 'proportion or analogy' is his most useful heuristic procedure. Arithmetically 1 is to 2 as 10 is to 20, and linguistically *rex* is to *regi* as *lex* is to *legi*. By applying analogy in this way Varro determines that Latin has four *partes orationis* 'parts of speech': words with case, words with tense, words with both, words with neither. Within any given part of speech, further classification is possible, and Varro discovers or creates both declensions and conjugations. Because he ignores vowel length, his five declensions are not the same as ours, and his conjugations are only three in number; nonetheless he has succeeded in identifying, perfectly in theory and almost so in practice, the declensions and conjugations of Latin. Varro's status as grammarian *par excellence* is unquestioned, and he is the most frequently cited source in the Roman grammatical tradition and *ergo* the first authorial figure in the history of Latin linguistics.

5. Early Roman Imperial Grammar and the Alexandrian Renaissance

Scholars of all sorts flock to Rome during the early empire and publish extensively, but most texts are lost. As the pace of language science accelerates, its prominence increases, and the discipline inevitably attracts criticism from *literati*. The first Latin lexicon is published, as are treatises on orthography and metrics, and grammar apparently assumes its canonical shape during the first two centuries of the Christian era. The works of Palaemon and Probus are lost, but their stature is such that subsequent volumes are spuriously attributed to them. Genuine references suggest that Probus' area of expertise is the verb and Palaemon's the uninflected parts of speech. Palaemon is credited with authoring the first Latin *ars* and with substituting the interjection for the article, which Latin lacks, in the Alexandrian and now traditional list of the *partes orationis*.

Our most extensive extant linguistic text is Quintilian's account of the grammatical curriculum in first-century AD Roman education, but it is not clear whether his sketch presents an idealized or an actual version of contemporary language science. Quintilian's organizational scheme fits well with that of the *ars* in subsequent centuries, however. Grammarians and their students first study sounds, then word derivation, then the parts of speech, next declension and conjugation (though Quintilian himself is oblivious to Varro's nominal and verbal affiliations), and finally the virtues and vices of speech, particularly barbarisms and solecisms. The tripartite arrangement of the later monumental *artes*—phonology, morphology, *vitia virtutesque orationis*—is therefore present in Quintilian, implicitly if not explicitly. Quintilian is not himself a grammarian, but his text is our best source for early imperial grammar.

Meanwhile, Alexandria manages to produce two Greek scholars, Apollonius Dyscolus (cf. Householder 1981 and Blank 1981) and his son Herodian, in the second century AD, whose importance and influence are considerable. Apollonius' approach to language science dominates Byzantine grammar and is also incorporated into Priscian's (see below) Latin grammar; Herodian's works have not survived independently, but he is copiously quoted by later Greek grammarians. Moreover, Apollonius is the first ancient grammarian Greek or Roman whose book-length works, or at least four of them, have been preserved more or less *in toto* and also the first formal syntactician in Graeco–Roman linguistics.

Apollonius is a rationalist and an analogist: linguistic problems have reasonable solutions, and similar problems have analogous solutions. Language is by nature logical, orderly, and rule-governed; any and all deviations from linguistic logic, order, and rule are explicable by reason and analogy; and grammatical analysis is therefore principled behavior designed to discover rules and to explain exceptions. Apollonius assumes an underlying structure for all levels of language. Thus there is an order to the letters of the alphabet, to the parts of speech, to the cases, and to the sentence. Letters combine into syllables, syllables into words, and words into sentences, but constraints obtain; therefore none of these combinatorial processes is random. Change (*pathos*) affects each level, however, and Apollonius analyzes change as addition, deletion, substitution, and transposition, i.e., the four transformations or the *quadripertita ratio*. Just as words are subject to *pathos*, i.e., are misspelled, and are corrected by the theory of spelling, so too sentences may consist of improperly combined *noēta* 'meanings' (Apollonius is also a mentalist) and may be corrected in accordance with syntactic theory. Apollonius' insistence on an underlying structure to phonology, morphology, syntax, and semantics is remarkably forward-looking and allows him to stress *katallēlotēs* 'grammaticality' and to seek such structures where they are not overtly apparent. In effect, Apollonius has mined the work of his predecessors and has extracted syntax from it.

Apollonius and his contemporary Sextus Empiricus are about as diametrically opposed in their thinking on linguistics as they could possibly be. For Sextus, a science of grammar is simply not possible, and he therefore debunks Stoic and Alexandrian grammatical doctrines with impartial glee. Notwithstanding his negative approach, Sextus proves himself a keen observer or, rather, listener, for two of his most striking arguments concern phonology and linguistic variation. By his day the sounds of Greek had changed: *oi*, *ei*, *ou*, and *ai* are no longer diphthongs; *zeta* is now simply [z]; the aspirated stops *phi*, *theta*, and *chi* have become continuants; etc. Although he seems to have no principled theory of phonology, Sextus reports these and other data quite accurately. He also stresses the role of style, register, or idiolect and how it varies from speaker to speaker or from speech act to speech act. In both cases Sextus adduces his observations in order to argue, *pace* his predecessors, that neither analogy nor usage, separately or in tandem, can establish correctness in speech. We know little about either Apollonius (e.g., why he was called Dyscolus 'ill-tempered') or Sextus (e.g., where he lived), but together they constitute, chronologically at least, the last chapter in the history of ancient Greek linguistics.

6. The Roman *Ars grammatica*

In late antiquity grammar is the acknowledged queen of the sciences. The works of many grammarians are extant and include references to numerous other grammarians and/or grammatical treatises otherwise unknown or lost, and the social status of the grammarian in late antiquity likewise testifies to the importance of his discipline (cf. Kaster 1988). The sheer quantity of late antique grammar dwarfs that of the preceding centuries taken collectively. Nonetheless, the historiographical situation of those texts is less than felicitous. Few texts have been properly edited, and we are unfortunately almost exclusively dependent upon Keil's (1857–80) mammoth collection. Prosopography is a mess, footnoting is casual at best and often neglected entirely, plagiarism is rampant, and several texts are spuriously attributed to notable figures who could not possibly have authored them. Generically, the extant *artes* range from textbooks to reference grammars, and their authors from professionals to admitted amateurs; a new genre, the grammatical commentary, i.e., a commentary on a grammar itself, emerges late in the tradition. Contents vary as authors emphasize their favorite themes or areas of expertise, and methods too range from the purely formal to the heavily semantic. Moreover, despite such variation these *artes* do manifest an apparent sameness which obfuscates their authors' independence of thought (but cf. Hovdhaugen 1986 and Taylor 1991). Sorting out the historical course of progress, dependence, influence, innovation, and so forth is therefore virtually impossible, but the wealth of grammatical knowledge contained in these copious *artes* is undeniable. Phonology, spelling, orthography, metrics, parts of speech and their accidence, declensions, conjugations, comparison, *vitia virtutesque orationis*, and even syntax all receive extensive analysis, as do countless other topics, and elaborate taxonomies of one sort or another abound.

Sacerdos (third century AD) authors the first extant *ars*, but it is the fourth century that testifies most abundantly to the enhanced status of language science. Charisius' *ars* reveals a grammarian who uniformly exercises his own judgment in the course of compiling what is a *de facto* reader of Roman grammatical literature, and Diomedes is sometimes quite radical in his grammatical analysis. The most famous and influential grammarian of the century is Aelius Donatus, for both his *Ars maior* and *Ars minor* are classics. The organization of the former represents an ideal culmination to the process we have seen develop from Aristotle through Quintilian. First comes phonology, then the parts of speech, and finally stylistics, which is treated primarily in terms of errors. The *Ars minor* is a series of questions and answers which concentrate exclusively on the *partes orationis* and which therefore testify to the central role of morphology in Latin grammar. Even St Augustine gets into the grammatical act, most notably with his *De Dialectica*, which reprises much of Stoic linguistics. Marius Victorinus, Macrobius, and Dositheus author texts proving that the Roman empire and hence grammar are bilingual and that contrastive linguistics is now a fact of the discipline. Grammatical activity is no less frenetic in the next century. Consentius and Phocas both limit their *artes* to the noun and verb: the former does so via a schoolbook approach with an emphasis on definitions and explanations, whereas the latter offers a *regula*-type of grammar emphasizing rules, paradigms, and examples. Servius, Cledonius, and

Pompeius initiate the grammatical commentary by explicating and elucidating Donatus. Martianus Capella's bizarre fantasy on the marriage of Mercury and Philology validates Varro's original ranking of the *ars grammatica* as the first of the *artes liberales*.

Graeco–Roman language science inevitably draws to a close, but not without a consummate swan song in the form of Priscian's *Institutiones grammaticae*, the 18 books of which are transmitted in nearly 1,000 manuscripts. Priscian concentrates on morphology, and his morphological analyses are among the most extensive in the entire history of language science. Gone are such ancillary topics as orthography, metrics, the virtues and vices of speech, etc., but in their place are examples and literary quotations by the thousands. Clearly, Priscian is a data-oriented language scientist, sometimes too much so, for his desinential arrangement of nouns and verbs offers few if any insights. Priscian has digested Greek and Latin grammatical literature thoroughly, but semantics reigns supreme in his linguistic theory, due in large part to his dependence upon Apollonius Dyscolus, an observation which brings us to the surprising climax to the history of Greek and Roman language science. In books 17 and 18 of the *Institutiones* Priscian's subject is syntax, and he relies on Apollonius for theory, form, content, and methodology. Reason, analogy, order, and, obviously, semantics figure prominently in Priscianic syntax. Priscian cites Apollonius repeatedly, reiterates the dual patterning so extensive in Greek and especially Apollonian linguistics, and even recasts in Latin Apollonius' famous analogy between spelling and syntax. He also follows Apollonius' lead in what are arguably his most significant syntactic procedures, namely, the decomposition of complex syntactic structures with subordination into synonymous but coordinate simple structures, and the analysis of elliptical constructions on the basis of complete ones. His analyses of the ablative absolute, gapping, the passive transformation, and impersonal verbs are especially noteworthy. Priscian's supreme achievements in language science are easy enough to appreciate but difficult to assess in detail, for 'we have no extensive study of him nor even a satisfactory philological edition of his work' (Hovdhaugen 1982: 105).

7. Conclusion

Western intellectual history would not be the same without the contributions of classical antiquity's language scientists, for almost every major intellect in Greece and Rome turns his attention to linguistics at some point or another. Individually and collectively the grammarians of antiquity set the course for language science in the future. To be sure, much of what they discover becomes lost or forgotten and is only rediscovered later, usually without any acknowledgment or even understanding of antiquity's claim on originality. Those contributions which are acknowledged, however, are formidable: Stoic logic is decidedly *au courant*, the *Technē*'s influence is indisputable, Varro's declensions and conjugations are revised and become the standard fare of Latin students the world over, Donatus' *artes* are the norm and model of grammatical literature and the centerpiece of educational curricula for over a millennium, and Priscian's grammatical theory generates much of medieval philosophy. The four transformations, parts of speech, grammatical terms, the word-class system, word-and-paradigm grammar, sign and referent, and dozens of other linguistic matters first articulated in Greece or Rome are still with us. If the history of Graeco–Roman language science is not always as well documented as we would like, it is nonetheless sufficient to inspire and inform.

Bibliography

Baratin M, Desbordes F 1981 *L'analyse linguistique dans l'antiquité classique. I: Les théories.* Klincksieck, Paris

Blank D 1981 *Ancient Philosophy and Grammar: The Syntax of Apollonius Dyscolus.* Scholars Press, Chico, California

Della Casa A 1973 La grammatica. In: *Introduzione allo Studio della Cultura Classica. II: Linguistica e Filologia.* Marzorati, Milan

Di Benedetto V 1958–59 Dionisio Trace e la techne a lui attribuita. *Annali della Scuola Normale Superiore di Pisa Series II* **27**: 169–210; **28**: 87–118

Di Benedetto V 1973 La techne spuria. *Annali della Scuola Normale Superiore di Pisa Series III* **3**: 797–814

Householder F 1981 *The Syntax of Apollonius Dyscolus.* Benjamins, Amsterdam

Hovdhaugen E 1982 *Foundations of Western Linguistics: From the Beginning to the End of the First Millennium AD.* Universitetsforlaget, Oslo

Hovdhaugen E 1986 Genera verborum quot sunt: Observations on the Roman grammatical tradition. *Historiographia Linguistica* **13**: 307–20

Kaster R 1988 *Guardians of Language: The Grammarian and Society in Late Antiquity.* University of California Press, Berkeley, California

Keil H (ed.) 1857–80 *Grammatici Latini*, 7 vols. and supplement. Teubner, Leipzig

Kemp A 1986 The *Technē Grammatikē* of Dionysius Thrax: Translated into English. *Historiographia Linguistica* **13**: 169–89

Lersch L 1838–41 *Die Sprachphilosophie der Alten*, 3 vols. König, Bonn

Pinborg J 1975 Classical Antiquity: Greece. In: *Current Trends in Linguistics. XIII: Historiography of Linguistics.* Mouton, The Hague

Rawson E 1985 *Intellectual Life in the Late Roman Republic.* Johns Hopkins University Press, Baltimore, Maryland

Robins R 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Schmitter P 1991 *Geschichte der Sprachtheorie 2: Sprachtheorien der abendländischen Antike*. Narr, Tübingen

Steinthal H 1890–91 *Geschichte der Sprachwissenschaft bei den Griechen und Römern mit besonderer Rücksicht auf die Logik*, 2 vols. Dümmler, Berlin

Taylor D J 1974 *Declinatio: A Study of the Linguistic Theory of Marcus Terentius Varro*. Benjamins, Amsterdam

Taylor D J 1991 Latin declensions and conjugations: From Varro to Priscian. *Histoire Epistemologie Language* **13(2)**: 85–109

Plato and His Predecessors

Fred W. Householder

The basic notion of grammar on which all later Greeks built (see *Aristotle and the Stoics on Language*) was developed by various nameless people between Homer and Socrates. The few whose names are still known (other than mythical ones like Cadmus, the bringer of the Phoenician alphabet to Thebes) are all of the fifth century, some called 'sophists,' others 'philosophers,' and it is mainly from Plato that one learns of them.

1. The Beginnings

In the second book of the *Iliad*, at the beginning of the Trojan catalog (2.804), the goddess Iris offers a comment on the variety of languages spoken by the allies of the Trojans, and near the end (2.867) the poet mentions in particular the 'barbarity' (i.e., non-Greekness) of the speech of the Carians. But nowhere in the *Iliad* does a Greek warrior have any difficulty communicating with a Trojan (or Lycian or Carian, for that matter), nor are interpreters ever needed or mentioned. (The first Greek to mention them [ca.430 BC] is Herodotus, 2.154, 4.24.) In the *Odyssey*, Odysseus sails all around the known world, and never meets anyone who speaks a language other than Greek (including Polyphemus, the Laestrygonians, Circe, and the Sirens). True, several words used by the gods are mentioned as distinct from human (i.e., Greek) words, but the difference is scarcely enough even to make divine speech a special dialect of Greek.

In the sixth book of the *Iliad* (6.119–236) Diomedes has a confrontation with the Lycian King Glaucus in which the latter traces his ancestry back to Bellerophon, a Greek from Argos who came to Lycia with some sort of message ('Kill the bearer' written in Linear B, perhaps) to the king. But the king, instead of killing him, puts him through a number of tests and then gives him his daughter's hand. This passage (6.169) is the only possible reference to writing in Homer, and even it is not unambiguous. Yet it cannot be doubted that some Greeks, namely those on Cyprus, could write at the time of Homer, since in Classical times (seventh to fourth centuries BC) they wrote in a syllabary closely related to Linear B, which was used by Greeks in Crete, Pylos, Mycenae, and Thebes (at least) around the thirteenth century BC. It cannot be doubted that some form of this syllabary was used continuously in the intervening centuries, though no specimens from those centuries survive, and hence there must have been teachers and schools throughout the period, apparently teaching both syllabary and alphabet by the fourth century BC.

The signs of the Cypriote syllabary are by no means all identical to corresponding signs of Linear B; 10 of them are, and another 20 are easily derived. Linear B was mainly written on wet clay (making curves easy); Cypriote on stones or metal (yielding a preference for straight lines), but, in addition, Cyprus dropped the separate set of *d* syllables (da, de, di, do, du), fusing them with *t*, but distinguished *l* syllables from *r* syllables. The first of these changes has occurred in other syllabaries (e.g., Cherokee, some Southeast Asian) and some alphabets, at least as an option (e.g., Gregg shorthand). It is not true that if a language once acquires a phonemically accurate script it never later drops any distinctions. But this particular case, in which voiced, voiceless, and aspirated stops are written alike, is very common in independently developed syllabaries all over the world: evidently the grouping of all labial stops is an easy piece of phonological analysis, and the Mycenaean and Cypriote Greeks certainly made it. The Semitic alphabet as adopted by the Greeks implies a grouping of voiced stops in the alphabetic order (B, G, D) and also the nasals (M, N).

But the remarkable contribution of the Greeks, apparently unique in the history of writing systems, was the obligatory writing of vowels as letters of the same size and type as those used for consonants. This does not come naturally; syllabaries do. In the Greek alphabet the only grouping or nonwriting of a distinction appears in the case of vowel length, normally unmarked in Linear B, the Cypriote syllabary, most Greek alphabets, Italian alphabets, and their descendants. The Greeks did eventually have two long vowel characters (*eta* and *omega*) opposed to two short ones (*epsilon* and *omicron*), but vowel length was just as contrastive for A, I, U (*alpha*, *iota*, *upsilon*). No doubt the whole development was, in part, a fluke, but no other independent system did the same things. One other distinctive feature, which was not at first completely indicated by the Greek alphabet, was aspiration in stops, but *chi* and *phi* were soon provided.

As noted above, there is good reason to believe that schools existed in Mycenaean times, and that they continued right through into Classical times, with two possible modifications. It is likely that Linear B was used and maintained by a special class of scribes, and that the schools were scribal schools. And some authors hint that the Dorians were illiterate for a few centuries, though it is known that there were lyric poets in Sparta by 675 BC or so (Terpander). But certainly almost everywhere in the Greek world, by around 700 BC there were schools for boys, and quite often also schools for girls (Sappho ran one such school), in which the students spent much of the day from the age of 6 or 7 years to 16 or 17. Thucydides mentions (7.29) a school in a smallish town (Mycalessus) in Euboea, 'The largest one there.' The town must, then, have had at least three or four such schools, but it is hard to guess how many students there were, though the context does indicate that school started early in the morning, something that is also known from Aeschines (*Against Timarchus* 8–12), who cites a law of Solon forbidding (in essence) schools to open before sunrise or close after sunset. Summer vacation is not mentioned, but seems likely.

What the teachers and pupils did during a decade of schooling is not known. A year might conceivably be spent on elementary reading and writing; there is evidence of syllable sequences like ar, bar, gar, dar, er, ber, ger, der, etc., and beta, alpha, *ba*, beta, epsilon, *be*, beta, ēta, *bē*, etc. (see Callias' *Grammatical Tragedy* cited in Athenaeus 7.276A, 10.448B, 10.453C), but it seems unlikely that this went on 10 hours a day for more than a year. After the elementary lessons, all the evidence is that they read, studied, copied, memorized, recited, and sang (or chanted) the works of poets, principally lyric and epic, but also iambic and elegiac. Here it must be noted that none of these poets wrote in the Attic dialect or confined themselves to familiar Attic vocabulary. Aristotle (who probably provides the best evidence for the traditional lore of the schools in the *Poetics*, ch. 19–22: 1437a–59a) lists seven different kinds of poetic words, three of which involve the four 'transformations,' whose importance for Greek linguistics continues as one moves from Plato through to Apollonius Dyscolus. And as for dialects, all choral lyric poems were written in some form of Doric, solo lyrics in Aeolic, hexameter and elegiac poems in a kind of old Ionic with some Aeolic admixture. Choral lyric, in addition, often has a quite complex syntactic and metrical structure and unusual word order. It is improbable that the teachers have refrained for two or three hundred years from helping the students to understand the words and structures of these poems. Bear in mind what Protagoras says about education (Plato, *Prot*: 338e–39a) 'I think the greatest part of a man's education is to be expert on poetry, i.e., to be able to understand what is said by the poets, to tell whether or not it is properly written, and to know how to discriminate among poems and give an explanation when asked.' This is surely a fifth-century belief; and, as he says earlier, 'if you should advertize for a teacher of Greek (*hellēnizein*), not one would show up.' Of course, that is exactly what teachers did claim to teach in the days of Sextus Empiricus, six centuries later. But in the sixth, fifth, and fourth centuries, they taught what Protagoras wanted; when the students grew up, as gentlemen of leisure, they had to put up a good show of being experts on poets and poetry. Nevertheless, the two basic sins, *barbarizein* and *soloikizein*, are mentioned early, the latter in Herodotus 4.117.1, and both in Aristotle *Soph.El.* 165b2.

2. The Sophists

Besides the schools of the grammarians, the fifth century BC saw the rise of higher education, the schools of the sophists. What they taught was mainly what later became rhetoric, essentially the principles of writing good prose. While the Greek of the grammarians' schools was unlike their students' native dialect, that dealt with by most of the sophists was that very native dialect. But they rarely considered this from a grammatical or linguistic viewpoint. And, while the grammarians dealt with the rhythms of poetry, sophists might dispute about the appropriate rhythms for prose, especially at the ends of sentences (*clausulae*, to use the Latin name). In vocabulary they did not need to interpret rare or dialect words, but they did assign great importance to discriminating synonyms, and (in general) defining abstract words.

One sophist stands out above the rest for his interest in grammar, Protagoras, about whom tantalizing bits of information come from Plato and Aristotle, as well as Diogenes Laertius. He first distinguished four types of sentence—wish/prayer, question, answer, command (Diogenes Laertius 9.53; Quintilian, *Inst.* 3.4.10)—and reprehended Homer (Aristotle *Poetics* 1456b, 15–18) for using the imperative ('command') in prayer to a goddess instead of the optative ('prayer'). This criticism of course depends on the pre-existence of the name *euktikē* (from *euchomai*, 'I pray') for what one calls the 'optative mood.' In fact, Homer's use is the correct one: second-person prayers to divinities normally are in the imperative. And one can be reasonably sure that Protagoras used the four transformations (see Sect. 3), from Socrates' use of the term *hyperbaton* (transposition) in Plato's *Protagoras* (343F).

But the main contribution of Protagoras seems to have been in syntax, where a passage on solecism in Aristotle's *Rhetoric* (1407b) combined with one in his *Sophistic Refutations* (173b) seems to suggest that Protagoras discussed errors of agreement (solecisms) in gender, for which he used (possibly from the tradition of the *didaskaloi*) the names 'males,' 'females,' and 'things,' (in that order); and also in number (Aristotle says 'many and few and one,' probably for 'many and two and one').

3. Plato

It is primarily from Plato (especially the *Theatetus*, *Cratylus*, *Protagoras*, and *Sophist*) that an idea of fifth-century state-of-the-art grammatical science is gained (with additional evidence from Aristotle's *Poetics* and other works). There are several reasons for believing that Plato is not proposing innovative ideas and terms of his own, but merely avoiding anachronism in presenting the conversations of Socrates and his friends.

Clearly, several features of later grammatical art must have been introduced in the fifth century or before.

(a) The four *pathē* or transformations (addition — also known as pleonasm, redundancy, insertion, epenthesis, etc.; subtraction—deletion, ellipsis, elision, apheresis, etc.; substitution—enallage, hypallage, commutation, etc.; and permutation—transposition, metathesis, hyperbaton, anastrophe, etc.—in Plato's *Cratylus* 394B, 414C–D, 426C, 432A, etc.) used for etymology, but also for morphology (in treating irregular inflexion) and syntax (as in *Protagoras* 343F).

(b) The terms '*onoma*' and '*rhēma*,' whether for 'noun' and 'verb' or 'subject' and 'predicate' (as often in Plato), and possibly '*arthron*' and '*sundesmos*' (later meaning 'article' and 'conjunction,' but at first including prepositions and some other function words).

(c) The word *ptōsis*, at first meaning any inflected form (as in Aristotle), but later 'case,' and some names for the cases—either the later *eutheia* for the nominative (or perhaps Aristotle's *klēsis*), *genikē* for the genitive, etc., or perhaps more likely the names used by Aristotle (*to toutou* 'the of-this,' i.e., 'genitive'; *to toutōi* 'the for-this,' i.e., 'dative,' etc.).

(d) The traditional order of the cases (nom, gen, dat, acc, voc) may have existed in the fifth century, though a clear example does not appear until Cleochares (ca.300 BC), as quoted in pseudo-Herodian's *Peri schēmatōn*, produces an instance of *poluptōton*, the use of a particular noun or pronoun (in this case 'Demosthenes') in the same position in five successive phrases, in a different case each time, with the cases in the traditional order. The traditional order of genders (masc, fem, neut) appears already in Protagoras (quoted above) and several times in Aristotle, but the order of numbers (singular, dual, plural), though perhaps natural (since the *klēsis* or basic form is always nom, sing, masc) is not attested early.

(e) The notion of dual patterning (Hockett) or double articulation (Martinet), that, essentially, the rules for correctness of sequences of vowels and consonants are unrelated to those for sequences of nouns, verbs, etc., appears first in Democritus (565, as cited in Isidore's *Etym.* 13.2.4. 108) and then in Plato (*Theaet.* 202–04, *Cratylus* 424–25, 431–32), though until Apollonius Dyscolus (*Synt.* 1.1–2) it often appears as a merely hierarchical arrangement: letters make syllables, syllables make words, words make sentences, and (in Plato's *Cratylus* 432A–C) sentences make discourses. But Apollonius clearly makes letters and syllables concrete, perceptible entities (Stoic *aisthēta*), while words and sentences are abstract, thinkable entities (*noēta*), so the Stoics should be given credit for the correct form of 'dual patterning.'

The amount of phonology current in the fifth century BC is probably reflected in Plato, who (in *Crat.* 431–32) assigns the topic to the science of *grammatikē*, and in Aristotle's *Poetics* (ch. 20, 1456b 25–31). Here (and in Plato's *Theaet.*), the distinction between vowels and consonants is clear, and among consonants there is a distinction between *psophoi* (noises: presumably *s*, *ksi*, and *psi*) and *phōnai* (voices: *m*, *n*, *r*, *l*) and consonants which are *aphōna* (all the stops—*ptkbdg*, *phi*, *theta*, *chi*); Aristotle's *sumphōna* (latinized as 'consonants' but much narrower here) include both *s* and the liquids and nasals, i.e., our 'continuants.' Though words like 'labial' and 'dental' do not appear until much later, there is a curious inscription (*IG* II.5.4321) of about 350 BC which describes some sort of special notation (interpreted by some as shorthand) for just those two classes. There is no evidence of categories like 'aspirated,' 'voiced,' or 'voiceless' until much later, though the relation between [h] (for initial aspiration) and the aspirated stops must have been learned before students could spell correctly.

Another recurrent theme of Greek grammatical thought is the listing of sentence types, i.e., illocutionary forces (in the sense of John Austin) or (in a few instances) moods, which begins in Protagoras, as mentioned above, and culminates with the lists discussed in *Aristotle and the Stoics on Language*.

Finally, the notion to which Saussure gave the name 'arbitrariness of the sign' should be considered, i.e., whether or not there is some rational basis for the association of any given phonological sequence (of a word or morpheme) with a particular meaning or function. As conceived by the Greeks, the question was this: is the sound–meaning relation of all or some Greek words inevitable and natural? This is the main topic of discussion in Plato's *Cratylus*, but Aristotle, the Stoics, and Epicurus all also discussed the question, generally agreeing that all words are now arbitrary, though some suggest that there was once a time when they were not. Democritus (as quoted in Proclus' commentary on the *Cratylus* 16) offered four arguments (with four specially coined names) in favor of arbitrariness: (a) 'homonymy' or 'polysemy,' i.e., the same sequence of phonemes may be associated with two or more unrelated meanings; (b) 'polyonymy' or 'isorrophy,' i.e., the existence of synonyms; (c) 'metonymy,' i.e., the fact that words and meanings change; (d) 'nonymy,' i.e., the nonexistence of single words for simple or familiar ideas. Elsewhere (in Diodorus Siculus 1.8.3) Democritus argues for the 'polygenesis' of language—in other words, that there was no single proto-human language.

But a stronger claim than that of nonarbitrariness is the one implied by the famous experiment of Psammetichus as narrated by Herodotus (2.1–2), not just that some Greek words have a natural origin, but that some existing language really is the single proto-human tongue. This entails monogenesis, of course, plus the notion that only some languages undergo linguistic change. Psammetichus arranged for a child to be raised in such a way that it never heard anyone speak. When, at last, the child spontaneously uttered a word, it was *bekos*, which Herodotus tells us is Phrygian for 'bread.' This belief in a single original language comes into later European thought from the biblical tale of the Tower of Babel.

Plato thus gives a good idea of what might be called 'normal linguistics,' the kind of grammar that every man knew who had been to school as a boy in the fifth and early fourth centuries BC. This information can be supplemented by what can be read in Aristotle's *Poetics*, and one or two other places.

Bibliography

Ax W 1986 Quadripartita ratio: Bemerkungen zur Geschichte eines aktuellen Kategoriensystems (adiectio–detractio–transmutio–immutatio). *Historiographia Lingüistica* **13**: 191–214

Baratin M 1978 Sur l'absence de l'expression des notions de sujet et de prédicat etc. In: Collart J (ed.) 1978 *Varron, grammaire antique et stylistique latine*. Les Belles Lettres, Paris

De Mauro T 1965 Il nome del dativo e la teoria dei casi greci. *Atti della accademia nazionale dei lincei, serie ottava, rendiconti, classe di scienti morali, storiche e filologiche* **20**: 151–211

Desbordes F 1983 Le Schéma 'addition, soustraction, mutation, métathèse' dans les textes anciens. *Histoire—Epistémologie—Langage* **5**: 23–30

Donnet D 1967 La place de la syntaxe dans les traités de grammaire grecque, des origines au XII siècle. *L'antiquité classique* **36**: 22–48

Gentinetta P M 1961 *Zur Sprachbetrachtung bei den Sophisten und in der stoisch–hellenistischen Zeit*. P G Keller, Winterthur

Girard P 1889 *L'éducation anthénienne*. Hachette, Paris

Householder F W 1989 Review article on Taylor 1987. *Historiographia Linguistica* **16**: 131–48

Koller H 1958. Die Anfänge der griechischen Grammatik. *Glotta* **37**: 5–40

Pfeiffer R 1968 *History of Classical Scholarship: From the Beginnings to the End of the Hellenistic Age*. Clarendon Press, Oxford

Pinborg J 1974 Classical Antiquity: Greece. In: Sebeok T A (ed.) *Current Trends in Linguistics*, vol. 13: 69 126. Mouton, The Hague

Robins R H 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Steinthal H 1890–91 *Geschichte der Sprachwissenschsaft bei den Griechen und Römern*, 2nd edn. F Dümmler, Berlin

Taylor D J 1986 Rethinking the history of language science in classical antiquity. *Historiographia Linguistica* **13**: 175–90

Taylor D J (ed.) 1987 *The History of Linguistics in the Classical Period*. Benjamins, Amsterdam

Aristotle and the Stoics on Language

Fred W. Householder

The period from about 350 BC to 150 BC was perhaps the most productive for Greek linguistics. In the case of Aristotle, there exists a substantial portion of his writings preserved in manuscript; for all the others, including the Academy, Epicurus, and the Stoics, as well as the various scholarly writers associated with Alexandria and Pergamon, there remain only fragments, summaries, and comments preserved in later writings (often in two or more steps: 'Sextus Empiricus quotes Chares quoting Crates,' for instance). But, fortunately, the fragments of the Stoics are sufficient to give an excellent idea of their linguistic teachings. And, like Aristotle, they approach language from a philosophical, logical perspective.

1. Aristotle

Aristotle's linguistic output falls into two parts, one represented especially by chapters 19–22 of the *Poetics* (1456a–1459a), but also four paragraphs elsewhere (*Rhetoric* III, 5, 1407b; *Prior Analytics* I, 36, 48b–49a; and *Sophistical Refutations* 14, 173b–174a and 32, 182a–b); the other by the *Categories* and the *de Interpretatione*. The former items seem to contain substantially the standard analysis presented in the *grammatikē* of the fifth and fourth centuries BC, much like what is seen in Plato (see *Plato and His Predecessors*), while the latter represent Aristotle's own original research.

In the *Poetics* are three of the recurring linguistic topics of antiquity: (a) sentence-types or illocutionary forces (question, command, statement, etc.); (b) parts of speech (Aristotle does not here use the expression *meros tou logou*, but lists *sundesmos*, *onoma*, *rhēma*, *arthron*); and (c) the four transformations (addition, deletion, substitution, and transposition—here used for the derivation of poetic words from ordinary ones). There is also a clear anticipation of the pattern of later *technai* (grammatical sketches like Dionysius Thrax's): first a list of some technical terms (providing a table of contents), then definitions, subclassification, and discussion of each in turn, then, in the *Poetics*, a further subclassification of nouns and their inflections. The most interesting additions to Plato's treatment of phonology is the mention of voiced stops, shapes of the mouth, places (of articulation), and aspiration (a brief treatment, but basically better than in Dionysius Thrax). He treats tense, mood, case, and number in 1457a 17–22 (all called *ptōsis*), but gender in 1458a 8–17, since it is not an inflection (for nouns, at least), but an inherent property, partly signaled, in the nominative, by the final consonant or vowel. His only way of naming the cases is with the forms of *houtos* ('this'): *toutou* means 'genitive case,' *toutōi* 'dative,' etc. This usage recurs in *Prior Analytics* 4–9a 1–5 and *Soph. Refut.* 182a 32–b3 and 173b 26–37. It is interesting that Pāṇini sometimes uses the same device. Aristotle in some of these places uses it to indicate gender, though he knows the three Protagorean names also, and sometimes uses *metaxu* 'between' for the neuter.

The interesting addition in these last three passages and in the *Rhetoric* one (1407b) is what seems to be the standard fifth-century treatment of syntax. It is introduced under the heading of solecism (a word first attested in this sense in Herodotus 4.117.1). While there is only one word for correct Greek, 'hellenism,' there are two for errors: 'barbarism,' which includes all errors of pronunciation, spelling, inflectional morphology, and vocabulary choice, and 'solecism,' which means any error in syntax. In particular it refers to errors of agreement in gender, number (or case), of case government, and apparently certain instances of word-order and semantics (*Rhetoric* 1407b 6–7). The rules implied in these four passages are the following:

(a) correlative conjunctions (like *men* and *de*) should be made to correspond (and at a reasonable distance);
(b) each word should be placed so that its syntactical connection is unambiguous (remember the hyperbaton in Plato's *Protagoras* 343F);
(c) participles and adjectives must agree with the nouns they modify in case, gender, and number;
(d) the subject of a finite verb is in the nominative;
(e) the subject of an infinitive (unless identical with the subject of its governing verb) is in the accusative;
(f) the gender of a noun (as opposed to interrogative and sometimes relative and demonstrative pronouns) need not be the same as the sex or animacy of its referent;
(g) a relative pronoun must agree in gender and number with its antecedent;
(h) a predicate noun or adjective with a verb like *einai* 'to be' agrees in case with its subject;
(i) words like *isos* 'equal to' govern the dative;
(j) words like *diplasios* 'double' govern a genitive; and
(k) transitive verbs (like *tuptō* 'hit' and *horō* 'see') govern the accusative.

All of these passages, except the one in *Rhetoric*, also include a technical term for 'nominative singular' (besides *houtos*) or, sometimes, 'nominative singular masculine,' or, perhaps, in one passage, 'the termination of the nominative singular,' *klēsis*. This is opposed, of course, to the *ptōseis*, which are all the other forms (case, number, and gender) of a noun, pronoun, or adjective (which are all *onoma* to Aristotle).

The reason why syntax is discussed in all these passages is the same, to show how some *soloikismoi* may either be used to deceive your interlocutor or audience, or else be analyzed to avoid being deceived or to refute an opponent. (Since the sixth century, when an educated man need only be able to discuss and analyze poems at a dinner party or drinking party, a new recreation had arisen in Athens, to which Plato's dialogs give literary life, the disputation on philosophical or technical points.)

To sum up, the grammar sketched in the *Poetics* and used in Aristotle's discussions of solecism may be said to summarize the linguistic achievements of the fifth century, and thus, in a sense, represent the earliest grammatical treatment of Greek that can be reconstructed.

The *Categories*, by contrast, contain a great deal that is new. In spite of the vague similarity of Plato's *onoma* and *rhēma* to 'subject' and 'predicate,' it is only in Aristotle that the notion of 'predicate' is really developed. And even he does not provide a perfect expression for 'subject': *hupokeimenon* is indeed the source of our term calqued into Latin—*hupo*=*sub*, *keimenon*=*jectum*—but none of the later grammarians made such use of it. For Apollonius Dyscolus it is almost as often used for the object as for the subject, and he often flounders around for lack of such a term. But after the rediscovery of Aristotle, the term does come into grammatical use. The *Categories* (the term means 'predicates' or 'predicate-types') does, however, provide the only elaborated classification of predicates outside of the Stoics. Essentially Aristotle envisages a formula S = X + (is/are) + Predicate in which the 'is/are' may sometimes be swallowed up in the Predicate (see *De Interpretatione* 21b *badizei* 'walks' equals *badizōn esti* 'is walking') and lists 10 different types of Predicate, which he may or may not have meant to be an exhaustive list, based, apparently, on a mixture of semantic and formal (morphological or syntactic) criteria, but which certainly comes close to being exhaustive. The traditional names of these predicate-types can be matched up with grammatical classes as follows:

(a) Substance (including particulars, species, and genera) = noun phrases, including proper nouns and definite NPs as particulars, simple NPs as species and genera;
(b) Quantity (including size) = adjectival expressions of size and number (but excluding words like 'big' and 'little,' 'many' and 'few,' which are really *relative* terms (*pros ti*)), hence numbers and numerical phrases;
(c) Quality = nonquantitative, nonrelative (although Aristotle suggests that some adjectives are both qualitative and relative), adjectives, and adjective phrases;
(d) Relation (*pros ti*) = adjectives which may be compared (or modified by 'more,' 'very,' 'so,' etc.) and nouns which require or imply a dependent genitive (like *father*, inalienably possessed, or like *knowledge*, nominalizations of transitive verbs);
(e) Place = adverbs and prepositional phrases of place;
(f) Time = adverbs and phrases of time;
(g) Position (*keisthai*) seems to include stative verbs of sitting, standing, lying down, and the like, though it probably is not limited to human subjects;
(h) State (*echein*) appears to mean perfect passive verbs other than any included in Position;
(i) Action (*poiein*) seems to include both transitive and intransitive verbs (in the present or aorist especially);
(j) Affection (*paschein*) includes verbs in the passive voice plus other verbs of sensation or emotion.

Though a few of the same terms will be met later in Dionysius Thrax's lists of verb voices, noun types, and adverb types, most of these notions do not appear in later grammarians.

The *De Interpretatione* (*peri hermēneias*) starts out with some more precise definitions of terms seen before, like 'noun' and 'verb' and 'sentence,' plus some new ones like 'proposition.' The opening paragraph, however, contains an interesting refinement of the innateness assumption used by Psammetichus: 'What occurs in speech are symbols of feelings in the mind, and what is written are symbols of what is spoken. Speech is not the same for all men, any more than writing is, but the mental feelings of which spoken words are signs, *are* the same for all, and likewise the things (*pragmata*) of which those feelings are symbols.' This defines four layers: 'things' in the outside world are symbolized by 'feelings' (*pathēmata*) in the mind (and both the things and the feelings are the same for all men), which are, in turn, symbolized by speech, spoken words (*phōnē*), which, in their turn, are represented by writing (*grammata*). This layer of *pathēmata*, then, constitutes a universal mental language common to all men. This view is, of course, more a matter of psychology than linguistics, but it seems to occur again in the Stoics, and to be presupposed by some modern linguistic and semantic theories.

Here again are met not all six of the illocutionary forces listed in the *Poetics* (command, wish/hope/prayer, statement, threat, question, and answer), but at least one of them, statement or proposition (*apophansis*), which is the only one capable of truth or falsity (this must also include 'answer,' as he says in 17a, which does not really belong on the same list as the others). All through the *De Interpretatione* Aristotle emphasizes the arbitrariness of the sign (*kata sunthēkēn*), as in the initial paragraph quoted above.

The improved definitions of noun and verb include the notions of tense (verb is [+tense], noun is [−tense]) and minimality (no fully significant parts). The Greek negatives (*ouk/ou* and *mē*) are treated as prefixes, and negatived nouns or verbs (remember adjectives are also nouns) are called indefinite (*aorista*) nouns and verbs. The name *ptōsis* is given to the oblique cases of nouns (genitive, dative, etc., is the order, though no names are used); subjecthood possibility is made the criterion for nouns in the strict sense (i.e., nominatives). The same name (*ptōsis*) applies to verbs for all tenses (he mentions past and future) except the present indicative; nothing is said here about subjunctives, optatives, infinitives, and participles. Unlike nouns and verbs, sentences (*logoi*) have meaningful parts, but not parts capable of being true or false (this clearly excludes complex and compound sentences, which he alludes to later). Incidentally, though this discussion of propositions or simple sentences makes much reference to subjects, neither *hupokeimenon* nor any other term for subject is used.

Numerous small references to linguistic matters (including phonetics) occur elsewhere in Aristotle, but these are the main passages of interest.

2. The Stoics

It is the work of the Stoics which clearly establishes most of the framework for later grammatical writing. Though Zeno (at least to some extent) and Chrysippus (see the numerous titles listed in Diogenes Laertius VII 191–92, and also for syntax, VII 63) did the basic work, much of our knowledge (for phonology and morphology) comes from Diogenes the Babylonian as quoted in Diogenes Laertius VII 55–60 (though there are many other sources). It is possible, of course, that if the complete works of Aristarchus had survived the Alexandrians might be assigned more importance than the Stoics. Diogenes of Babylon's treatise was not called 'Grammar' (*Technē grammatikē*) but *Peri Phōnēs*, which is hard to translate; *phōnē* is a very widely used word meaning, in grammarians, most often 'word' or 'phonological word,' but also 'voice' (of animals or man), 'speech,' 'utterance,' or even sometimes 'style' or 'sound' (though noises made by inanimate objects are sometimes excluded). Among the Stoics *phōnē* is sometimes restricted to the concrete *aisthēton* 'perceptible,' which is the *sēmainon* 'signifier' (as opposed to the *sēmainomenon* 'signified' which is *noēton* 'thinkable' or abstract), but Diogenes clearly includes more. Similar variation applies also in the case of other words for 'word,' e.g., *dialektos* (so used by Plato and Aristotle, though Diogenes narrows it down to 'other Greek dialect word') and *lexis*, 'significant word' or 'spellable word' for the Stoics, but often also 'speech,' 'expression,' 'style,' and, of course, *onoma* and *rhēma*, which may both be simply 'word' in Plato and Aristotle, though not in the Stoics. *Logos*, which always means 'sentence' or 'proposition' in grammar and logic, never means 'word,' though occasionally it means 'prose work' and, of course, 'reason' and related ideas.

Though the Stoics add only one new 'part of speech' (which should, of course, have been rendered 'part of the sentence' from Plato on) to Aristotle's list, the *prosēgoria* ('common noun,' *onoma* being now restricted to 'proper noun'), they give new definitions. This involves, in part, the incorporation of Aristotle's 'substance' into 'quality,' so that proper nouns signify an 'individual quality,' and the use of a feature [+incase] for verb, conjunction, and article (now apparently restricted to the definite article, though later the simple relative pronoun is also included). And, though Antipater's proposed adverb (*mesotēs*) does not catch on, a new term *morion* ('particle') does come into use, without being defined, entailing not a new part of speech, but a new classification of words, roughly into full words and empty words, to use modern terms. Examples are: Diogenes Laertius VII 64 referring to the preposition *hupo*, 70 referring to the negative *ou*/*ouk*, the negative prefix *a-*/*an-*, the indefinite pronoun *tis*—cf. Sextus Empiricus *Math.* 8.96—and the demonstrative *ekeinos*. It is often used for words which do not clearly come under any of the official parts of speech. Neither Plato nor Aristotle used the word in this way, nor does Dionysius Thrax, but Apollonius Dyscolus does. Schneider (in his index, *Grammatici Graeci* II, 3) thinks it is merely a synonym of *meros logou* or *lexis*, 'word,' but no two of these three are used in exactly the same way. Both *morion* and *lexis* (but not *meros logou*) may be used with adjectives like 'verbal,' 'pronominal,' but only *morion* occurs with a whole bunch of adjectives ('uninflected,' 'meaningless,' 'interrogative,' 'enclitic,' 'indefinite,' 'underlying,' etc.) and only *meros logou* is used with 'one,' 'two,' 'the same' and 'different' ('one m.l.' is a [compound] word, while 'two m.l.' is a phrase). Nouns and verbs are only rarely called *morion*, most of the examples being pronouns, small adverbs, interrogatives, indefinites, conjunctions, and prepositions. The Latin equivalent *particula* is used once by Priscian (*Inst.* XVII, IV, 29) for the Greek relative pronoun (here *infinita particula* 'indefinite particle'), though Portus in his translation of Apollonius uses it several times, with similar adjectives ('enclitic,' 'interrogative'), referring to various pronouns, conjunctions, interrogatives, articles, enclitics, and the comparative word 'more.' Aulus Gellius almost restricts his use to prepositions and verbal prefixes, but applies the word also to *saltem* ('at least') which is used like such Greek enclitic monosyllables as *ge*, a use which is almost the only one for modern grammarians. By Stoic definitions most of these 'particles' would be either adverbs or conjunctions.

Description of the major Stoic contributions to grammar, must start with the *lekta* ('sayables'), as expounded by Diocles Magnes (in Diogenes Laertius 7.66) and in Sextus Empiricus *Math.* 8.70. These are of two kinds, complete or sufficient (*autotelē*) and deficient or incomplete (*ellipē*). All *lekta* are said to be abstract (thoughts, in some sense, or meanings), though much that is said about them sounds to us like talk about the *expression* of thoughts. A complete *lekton* is a *logos* ('sentence') and these may be of several kinds (illocutions, sentence-types), as follows:

(a) statement or assertion (*axiōma*, *apophantikon lekton*), which alone can be true or false (this follows Aristotle), e.g., 'Dion is walking';
(b) yes/no question (*erotēma*), e.g., 'Is Dion walking?';
(c) *wh*-question (*pusma*), e.g., 'where does Dion live?';
(d) command (*prostaktikon*), e.g., 'Come here,' requiring the imperative mood;
(e) address or vocative (*prosagoreutikon*, *klētikon*), e.g., 'O King Agamemnon';
(f) superassertion or exclamation (*pleion ē axiōma*, or *homoion axiōmati* or *thaumastikon*), e.g., 'How that boy resembles the princes!'—(*psektikon* apparently is a variant of this with derogatory content);
(g) rhetorical question (i.e., a question not requiring an answer—*epaporētikon*), e.g., 'I wonder if life and sadness are interrelated';
(h) wish/prayer/curse (*euktikon*, or, if bad, *aratikon*), e.g., 'Zeus give victory to Ajax' or 'May his brain spill like wine,' requiring the optative mood (unreal wishes are ignored);

(i) oath (*omotikon*), e.g., 'I swear by Zeus to do that!'; and, finally,

(j) hypothesis or assumption (*ekthetikon* and *hupothetikon*, treated as different by our source), e.g., 'Let X be the center of a circle' or 'Assume that the earth goes around the sun,' with verbs in the third person singular imperative.

Those of these ten which do not require specific morphology often allow special conjunctions or adverbs. These are all real types, all syntactically distinguished in Greek (as well as English), but not all possible types or all that are distinguished in Greek. The omissions are potential/unreal 'statements' and questions, as well as questions expecting an imperative reply ('Shall I go?'). But no modern grammarian has done any better. In the case of *axiōmata* (falsifiable sentences, i.e., those which are capable of being judged true or false), Chrysippus also allowed (in building a kind of logical calculus) for compound/complex sentences of five basic types, with three or more subtypes. Though the expressions themselves are more logical than grammatical, the conjunctions involved are assigned related names, which appear again in Dionysius Thrax and other grammarians. The types are:

(a.1) real, indicative condition (*sunēmmenon axiōma*, conjunction 'if' —*ei*—, *sunaptikos*);

(a.2) subtype inferential, 'since'–clause (*parasunēmme-non*, conjunction 'since' —*epei*—, *parasunaptikos*);

(b) compound sentence (*sumpeplēgmenon*, conjunction 'both–and' —*kai–kai*—, *sumplektikos*);

(c.1) disjunctive sentence (*diezeugmenon*, conjunction exclusive 'either–or' —*ētoi–ē*—, *diazeuktikos*);

(c.2) subtype nonexclusive disjunction (*paradiezeugmenon*, conjunction nonexclusive 'or' —*ē*—, *paradiazeuktikos*);

(d) causal sentence (*aitiōdes*, conjunction 'because' —*dihoti*—, *aitiōdēs*, *aitiologikos*);

(e) comparative sentence (*diasaphoun to mallon/hētton*, conjunction '(more/less ...) than' —*ē*, *ēper*—, *diasaphētikos*).

All of these conjunctions appear on Dionysius Thrax's list and Apollonius Dyscolus' list; most appear in Latinized form in Priscian, who also uses some of the Greek names.

Before considering Stoic contributions to verb-classification and inflectional categories, first the modern view of the standard analysis of the Greek verb must be laid out. Greek verb forms are all assigned to one or another of four tense/aspect systems and three voices; this makes only 10, instead of 12 aspect–voice categories, because in two aspects (imperfective and stative/perfect) the forms for passive and middle are the same. The other two tense/aspects are the perfective (aorist) and the future, which is not really an aspect, and lacks two moods that all the others have: imperative and subjunctive. All 10 voice–aspect systems have an optative, an infinitive, a participle, and at least one indicative: the future has no forms with augment (i.e., a prefixed vowel) and past tense endings, the aorist (perfective) none without augment and with present endings, but the other two have both. Later grammarians (e.g., Dionysius Thrax and Apollonius Dyscolus) detached the participles entirely from the verb (because they satisfied both the [+tense] and the [+case] requirements which otherwise distinguish verbs from nouns). Two other forms are nowadays associated with verbs, the verbal adjectives or 'verbals' in *-tos*, *-tē*, *-ton* (like *lekton*, *aisthēton*, *noēton*, favorite Stoic terms) which more or less resemble adjectives in *-able* (*sayable*, *perceivable*, *thinkable*), and *-teos*, *-tea*, *-teon* (more or less like the Latin passive periphrastic, 'which must be said, perceived, thought'). All of the ancients, if they mention these at all, treat them as derivatives, not part of the conjugation. In each of the regular moods and tenses, most verbs have eight forms (first, second, and third person singular and plural, second, and third person dual), but imperatives lack a first person (for which the subjunctive is used). Some verbs are impersonal, and have only a third person singular (and it cannot have a nominative subject), meaning things like 'it is necessary,' 'it is best,' 'it is of interest,' etc.

Now can be considered which of these things the Stoics dealt with, and how. The treatment of predicates (*ellipē lekta*, 'incomplete sayables' or *katēgorēmata* (instead of *katēgoriai*) differs sharply from Aristotle's, most of whose predicates required a verb 'is,' in that they count verbs only, separated into four classes by the features [±__nom] and [±__oblique]. Verbs which are personal and intransitive (requiring no oblique case) are called *sumbama*. If they need an object of some kind, they are *hētton*/*elatton ē sumbama* (less than *sumbama*). If they are impersonal, i.e., do not allow a nominative case (i.e., subject) or more than one oblique case (usually dative), they are *parasumbama*. And if they occur with two obliques but no nominative, they are *elatton*/*hētton ē parasumbama* ('less than p'). But if they occur with two nominatives, but require no obliques (like 'is,' 'becomes,' etc.), the Stoics had no known name for them. These types continued to be distinguished, but new names were adopted for them.

The Stoics also introduced names for the voices: *sumbamata* in the active (governing accusative, dative, or genitive) are *ortha* (upright), a term which is sometimes mentioned by later grammarians, but is normally replaced (by *energētika* or *drastika* 'active'); the same verbs in the passive, capable of taking *hupo* (by) with a genitive ('of agent') are called *huptia* (prone), again normally replaced later by another word (*pathētika*, 'passive'); and verbs which take neither of those two constructions, being intransitive, whether active or middle in form, are called *oudetera* (neither). Dionysius Thrax includes both *epoiēsamēn* (aorist middle for us) and *pepoitha* (second perfect active) in his category *mesotēs* (middleness), and Apollonius also treats second perfect actives as middle, but apparently no other intransitive actives are called that; so the later 'middle' is not the same as Stoic *oudetera*. Nor is it equal to the Stoic *antipeponthota* (reflexively influenced), which are middle verbs with some reference back to the subject, as *keiretai* 'he gets a haircut' (not 'he cut his own hair') from *keirei* 'he cuts (someone's hair).'

Turning to the treatment of tense by the Stoics, there is a curious passage in the Scholia to Dionysius Thrax (on a passage where Dionysius speaks of the three kinships—*sungeneiai*—present to imperfect [*paratatikos*], future to aorist, and perfect to pluperfect):

> The Stoics say the present should be called 'present imperfect' (*paratatikos*, 'extended' which in Dionysius and later means simply the imperfect tense) for when you say *poiō* 'I am doing,' you imply that you were doing it before and will be doing it after the moment of speaking; and the imperfect should be 'past imperfect' for similar reasons... And the perfect tense (*parakeimenos*) is called [sc. 'by the Stoics'?] 'present *suntelikon*,' and its past is the pluperfect.

But *suntelikon* cannot be translated here as 'perfect' (to give a neat match 'present perfect' and 'past perfect' corresponding to 'present imperfect' and 'past imperfect') because everywhere that *suntelikos* or *sunteleia* is used to refer to an aspect (four or five times, in all) it refers to the aorist, not the perfect (some of these are infinitives, others imperatives, and one, *hixon*, is indicative). A possible conclusion is that the perfect is 'present perfective,' the aorist is 'indefinite perfective' [*aoristos* means 'indefinite'] and the pluperfect is 'past perfective,' while *suntelikos* by itself includes all forms of the aorist system; but it is not known what the nonindicative forms of the perfect system were called by the Stoics. As for the generic term for aspect, it is clearly *diathesis* (which also serves for *mood* and *voice*). The effects of this analysis are evident in Apollonius Dyscolus as well as Quintilian and Varro (for Latin, which has no distinction like the Greek one between aorist and perfect).

It is difficult to summarize the contribution of the Stoics to linguistic theory, but it appears enormous, both in the way they raise new grammatical questions and in providing solutions for older ones.

Bibliography

Arens H 1984 *Aristotle's Theory of Language and its Tradition: Texts from 500 to 1750*, Studies in the History of Linguistics **29**. Benjamins, Amsterdam

Arnim H von 1902 *Stoicorum veterum fragmenta*, vol. II, *Chrysippi fragmenta logica et physica*. Teubner, Leipzig. Repr. 1923

Ax W 1986 Quadripartita Ratio: Bemerkungen zur Geschichte eines aktuellen Kategoriensystems (*adiectio-detractio-transmutatio-immutatio*). *Historiographia Linguistica* **13**: 191–214

Baratin M 1978 Sur l'absence de l'expression des notions de sujet et de prédicat, etc. In: Collart J (ed.) 1978

Baratin M, Desbordes F 1986 La 'Troisième partie' de *l'ars grammatica*. *Historiographia Linguistica* **13**: 215–40

Barwick K 1957 *Probleme der Stoischen Sprachlehre und Rhetorik*. ASAW **49(3)**

Collart J (ed.) 1978 *Varron, grammaire antique et stylistique latine*. Les Belles Lettres, Paris

De Mauro T 1965 Il nome del dativo e la teoria dei casi greci. *Atti della accademia nazionale dei lincei, serie ottava, rendiconti, classe di scienti morali, storiche e filologiche* **20**: 151–211

Desbordes F 1983 Le schéma 'addition, soustraction, mutation, métathèse' dans les textes anciens. *Histoire-Epistémologie-Langage* **5**: 23–30

Donnet D 1967 La place de la syntaxe dans les traités de grammaire grecque, des origines au XII siècle. *L'Antiquité Classique* **36**: 22–48

Egli U 1970 Zwei Aufsätze zum Vergleich der stoischen Sprachtheorie mit modernen Theorien. *Arbeitspapier* Nr. 2, Universität Bern, Institut für Sprachwissenschaft

Egli U 1986 Stoic syntax and semantics. *Historiographia Linguistica* **13**: 281–306

Frede M 1978 Principles of Stoic grammar. In: Rist J M (ed.) *The Stoics*. University of California Press, Berkeley, California

Gentinetta P M 1961 *Zur Sprachbetrachtung bei den Sophisten und in der stoisch-hellenistischen Zeit*. P G Keller, Winterthur

Householder F W 1989 Review article on Taylor 1987. *Historiographia Linguistica* **16**: 131–48

Koller H 1958 Die Anfänge der griechischen Grammatik. *Glotta* **37**: 5–40

Pfeiffer R 1968 *History of Classical Scholarship*. Clarendon Press, Oxford

Pinborg J 1974 Classical antiquity: Greece. In: Sebeok T A (ed.) *Current Trends in Linguistics*, vol. 13. Mouton, The Hague

Pohlenz M 1939 Die Begründung der abendländischen Sprachlehre durch die Stoa. In: Pohlenz M 1965 *Kleine Schriften*, vol. 1. Olms, Hildesheim

Priscian (Priscianus) *Institutiones Grammaticae*, Hertz M (ed.) In: Keil H (ed.) 1859 *Grammatici Latini*, vol. III. Teubner, Leipzig

Rist J M (ed.) 1978 *The Stoics*. University of California Press, Berkeley, California

Robins R H 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Schenkeveld D M 1984 Studies in the history of Ancient Linguistics, II. *Mnemosyne* **37**: 291–353

Steinthal H 1890–91 *Geschichte der Sprachwissenschaft bei den Griechen und Römern*, 2nd edn. Dümmler, Berlin. Repr. 1961 Olms, Hildesheim

Swiggers P, Wouters A 1989a Langues, situations linguistiques et réflexion sur le langage dans l'Antiquité. In: Swiggers P, Wouters A 1989b

Swiggers P, Wouters A 1989b *Le langage dans l'antiquité, La pensée linguistique*, vol 3. Leuven University Press (Peeters), Leuven

Taylor D J 1986 Rethinking the history of language science in classical antiquity. *Historiographia Linguistica* **13**: 175–190

Taylor D J (ed.) 1987 *The History of Linguistics in the Classical Period*. Benjamins, Amsterdam

Telegdi Zs 1982 On the formation of the concept of 'linguistic sign' and on Stoic language doctrine. In: Kiefer F (ed.) *Hungarian General Linguistics*. Benjamins, Amsterdam

Dionysius Thrax, the *Technai*, and Sextus Empiricus

Fred W. Householder

The period between Chrysippus the Stoic (ca.250 BC) and the Roman polymath Varro (ca.50 BC) is practically devoid of linguistic writings available to us. Diogenes the Babylonian (see *Aristotle and the Stoics on Language*) survives in quotations by Diogenes Laertius (though some Stoic fragments preserved in Galen or Sextus may also be from the Babylonian), but famous scholars like Aristophanes of Byzantium and Aristarchus have left us only a few grammatical fragments. Aristophanes (according to Charisius) gave us the term *analogia*, and listed five criteria to be used in determining a correct analogue for inflection of a given noun (to which Aristarchus added a sixth). But this is a period during which grammatical sketches (*technai*) were being written. During this time (from 300 BC to 300 AD or so), the education system expanded; besides the school of the *grammatikos*, there was now also the rhetorical school and often also the philosophical school. But the grammatical school continued to be important; inscriptions have survived from Chios and Teos naming boys who won prizes in various categories—reading (aloud, of course), polymathy (i.e., history, geography, mythology), art, calligraphy, singing, lyre-playing, etc. And surely their teachers had aids of various kinds. Nothing that one would call a textbook used by pupils is known, but the *Technai* certainly could have been aids for the teachers.

1. The *Technai*

The most famous name associated with a *technē* is that of Dionysius Thrax. However, preserved on Egyptian papyri are 14 or more sizable fragments of other similar works (dating between 100 BC and 500 AD) which can conveniently be discussed together. Sizable is a relative term; the copy of the 'Dionysius Thrax' *Technē* considered here is 14 pages long, and one probably complete papyrus text occupies 3 pages.

There are two interesting features of the papyrus *technai*, though in most respects they closely resemble 'Dionysius Thrax.' (a) Two of them are in catechism or question-and-answer form (a form which is common in imperial and later Latin grammars); Dionysius Thrax has one example of this form, in the section on punctuation: 'What is the difference between *stigmē* ("period") and *hupostigmē* ("comma")? Time: for the *stigmē* the pause is long, but quite short for the *hupostigmē*.' (b) Many of the papyri give elaborate paradigms of the personal and possessive pronouns, where a form like *hēmeteros* 'our' nominative singular masculine is said to be 'outside third person masculine singular, inside first person plural.' 'Dionysius Thrax' gives a much sketchier treatment.

Though the manuscripts attribute our *Technē* to Dionysius Thrax (an Alexandrian scholar of the second century BC), it is quite possibly not really his work (certainly not in the extant form); for arguments on both sides see Di Benedetto (1958–59) and Robins (1987). Wouters (1979) includes some fragments of it, but they are all later than 300 AD. No doubt everything in 'Dionysius Thrax' is based on earlier sources, some surely even earlier than the real Dionysius Thrax, and it is quite impossible, or rather meaningless, to assign any particular date to the work itself, other than 'before 300 AD and after 200 BC.' Neither it nor the papyrus technai give any attention to a great anomaly–analogy war alleged by some historians (using evidence from Varro and Sextus Empiricus) to have flourished in that period. To put this in perspective, it will be useful to show how these terms were first used.

Even though Protagoras says that no teacher will claim to teach *hellēnizein* (to speak/write correct Greek), there must already have been some teacher who did that. Herodotus uses the term *soloikizein* (to make syntactical errors) in its usual sense, while *barbarizein* (to make errors in pronunciation and vocabulary/morphology) appears at least by Aristotle's time. And *hellēnizein* refers to the norm, which avoids all solecisms and barbarisms. If, however, an ordinary man wishes to decline a strange noun correctly or form the correct aorist of a new verb that he has met in reading, and there is no complete Greek grammar or dictionary available, how does he do it? He might ask a *grammatikos*, but how did he, in turn, find out? The normal answers given to this question were two: (a) analogy, and (b) usage. Analogy means (to the grammarian) finding the rules for saying that two or more words are inflected alike, when one is well-known, but not the other. Usage means finding out how Demosthenes or Thucydides inflected the word, or else how one's college-educated neighbor did so. By and large *grammatikoi* began to set themselves up as experts on both analogy (knowledge of the correct inflection) and usage (knowledge of the dialect of Demosthenes, etc.). Anomaly means irregularity; an anomalous word does not fit perfectly into any established class. And Greek, like other IE languages, has many irregular nouns and verbs. But the extreme positions of the two sides in the analogy–anomaly war, as sometimes reported, were surely never actually maintained: no one said that all irregular verbs must be regularized, or that each noun should have its own peculiar declension. In fact, everyone made use of both kinds of evidence, declension-type and usage, though Sextus Empiricus gives special value to the ordinary speakers' usage (for example, as opposed to Homer's).

The predecessors of these *technai* (whether called by that or some other name) included the grammar in Aristotle's *Poetics* and the grammar (*peri Phōnēs*) of Diogenes the Babylonian excerpted in Diogenes Laertius. These two already have the earmarks of the genre:

(a) they offer a definition of grammar, a discussion of phonology, including the accents and breathings, on the basis of the Greek alphabet, normally assumed (until Sextus Empiricus) to be correct or perfect;
(b) a brief section on metrics and prosody;
(c) definitions of 'sentence' (*logos*), 'word' (*lexis*) and parts-of-speech, with a list, sometimes commenting on differences (are there eight or nine?);
(d) sections following in a traditional order (sometimes discussed or justified) on each of the parts, always beginning with the noun (*onoma*) and its definition and examples, followed by lists of inflections, other categories, classes, and subtypes (with examples) of different kinds.

The noun has far and away the largest number of these technical terms, followed closely by the verb. The text usually ends with the listing of types of conjunctions, with examples. There appear to be a few variations in order in some papyri, and the passage of Sextus Empiricus (*Adv. Gramm.* I: 57–247) dealing with grammars is enormously expanded by arguments and quotations, and takes up several topics not mentioned in Dionysius Thrax or the papyri, as well as omitting many. But, although Sextus Empiricus, like Apollonius Dyscolus, falls within the period spanned by the papyri (Sextus ca.220 AD, Apollonius 150 AD), both of them show considerable independence of thought, and are entitled to individual treatment. Paradigms, which had perhaps already appeared in the fifth century, with the traditional orders of cases, genders, tenses (present, past, future), numbers, and persons, do not bulk large in these texts, except for personal pronouns, articles, and possessive pronouns, for which some papyri give exhaustive declensions, though Dionysius Thrax gives only the complete singulars of the definite article and the personal pronouns and the masculine singular of the singular possessives. One papyrus (no.23 in Wouters), which may not be from a *technē*, agrees with Dionysius in giving the singular present indicative forms of contract verbs, and even goes on to give the same forms of the imperfect. It is known that later on complete conjugations of type verbs such as *tuptō* 'hit' were in use, and it seems possible that these also existed earlier, but have not survived. The way the forms are used (like the Latin *amo*, *amas*, *amat*) suggests familiarity. Only Sextus Empiricus has a few singular noun declensions, because they are relevant to his arguments about analogy (correct declension by rule).

2. Dionysius Thrax

The *technai* (Dionysius Thrax and the papyrus ones) are elaborate organized lists of technical grammatical terms with some definitions and many examples, but with virtually no discussion or explanation. The text of the 'Dionysius Thrax' pamphlet considered here begins with a definition and division (into six parts) of grammar (clearly meaning the instruction given to schoolboys). This definition is quoted and discussed by Sextus Empiricus at some length, and attributed by him to Dionysius Thrax's *Parangelmata* (instructions). But in the pamphlet, what follows (after a short paragraph on reading aloud) deals almost exclusively with inflection, which, at best, is only implied in *analogias eklogismos* (calculation of inflectional similarity) plus accounts of all the parts of speech, which are not really covered by any of the six parts of *grammatikē* here listed. In later definitions of grammar all this fits under the 'technical' part of grammar, which is essentially what would now be meant by 'grammar.' It is obviously an organized summary of the linguistic knowledge of Greek up to the days of the compiler; it should not be supposed that he invented any of these names or definitions, or even chose any of the examples. He does contribute one explanation (in ch. 7), of the reason for calling *zeta*, *xi*, *psi*, *l*, *m*, *n*, *r*, and *s* *hēmiphona* ('half-sounders,' i.e., nearly 'continuants') and why *b*, *d*, *g*, *p*, *t*, *k*, *phi*, *theta*, *chi* are called *aphōna* ('nonsounders,' i.e., 'stops' or 'mutes'—a Latin rendering of *aphōna* 'speechless'). 'The *hēmiphōna* are so called because they are made up of *mugmoi* and *sigmoi* [roughly "cooings and hissings"] which are less pleasant sounding than vowels; and the *aphōna* are so called because they sound even worse than the others, just as a bad-sounding tragic actor is called *aphōnos*.' Whether the man who wrote that sentence was named Dionysius or not, is impossible to establish, but we cannot think of him as one of the great Alexandrian grammarians.

No matter what his merits, his work contains about 150 or so different technical terms of grammar; for at least 70 of them he is the oldest source known to the great Greek dictionary of Liddell, Scott, Jones & McKenzie. Many of those terms come directly into English (analogy, hypotaxis, diphthong, syntax, clitic, prototype, patronymic, anaphoric, deictic, aorist, barytone, oxytone, apodosis, etc.), even more by way of Latin calques (prepositive, postpositive, subjunctive, inflect, flexion, liquid, neuter, dual, participle, pronoun, adverb, comparative, superlative, verb, verbal, interrogative, reference, referential, ordinal, absolute, person, number, gender, conjugation, indicative, middle, active, passive, article, etc.). It provided almost the entire linguistic vocabulary well into the twentieth century. Some phonological facts reported here were probably well-known earlier (see *Plato and His Predecessors*), but he provides the first record: grouping of plain voiceless, aspirated voiceless, and voiced stops; correlation (but no names) of labials, dentals, and velars, though this is recorded on an earlier inscription. The terms used in the papyri are almost all the same as those used by 'Dionysius.'

3. Sextus Empiricus

Sextus Empiricus, in his skeptical proof that a science of grammar is impossible, provides a bit more information about the Stoics and the Hellenistic writers of *technai* (like 'Dionysius Thrax') though he never mentions Apollonius Dyscolus, but he also makes several remarkable and intelligent linguistic observations of his own. The most striking of his points are (a) those concerned with phonology and (b) those dealing with linguistic variation, not just dialects (which most grammarians had already discussed), but styles, levels, and idiolects, which are scarcely mentioned by any other ancient writer, and he makes the earliest mention anywhere of the role played in speech by the speaker's adjusting his style or vocabulary to his interlocutor, who, in turn, may influence the speaker by laughing or criticizing (*Adv. Math.* 1:228–35, and compare also 88–89, 176, 191, 195, 206, 220). The main point of Sextus' argument here is that neither *analogia* (knowledge of inflectional rules and types) nor *synētheia* (the usage of a particular person—the ideal speaker–hearer—or a particular group) is sufficient to establish correctness (*hellēnizein*); one must, in fact, know many different *synētheiai*, the usages of many different speakers, and be ready to adjust one's speech to suit new usages encountered for the first time. All these acute observations were almost without influence on later linguists, and had to be made again independently in modern times.

The other striking bit of observation and analysis arises from Sextus' attack on the notion, present in 'Dionysius Thrax' and almost all other ancient grammarians, that the standard Greek alphabet of 24 letters is a perfect phonemic analysis as it stands, an incredible (though universal) belief which Sextus takes delight in disproving, though he never makes a clear statement of phonemic or phonological principles. He does, however (p.135), mention the principle of opposition or contrast, and adumbrates the archiphoneme (proposing a five-vowel analysis for Greek at 108–11). He reports, correctly, that the sounds spelled *oi*, *ei*, *ou*, and *ai* are no longer diphthongs (indeed they are simple vowels corresponding to [y], [i], [u], and [e]), as tested by a simple observational experiment (pp.115–118, 169). He notes that *s* before *m* is voiced, and *zeta* no longer a sequence of *s* and *d*, but a simple [z] (pp.169, 174), and that *psi* and *xi* are indeed complex, and hence not true *stoicheia* or phonemes, but sequences of [p] and [s] and of [k] and [s] (p.104). Finally, he notes (what was true long before his day) that *phi*, *theta*, and *chi* are no longer aspirated stops, but continuants, voiceless fricatives. Of the leitmotifs of Greek linguistics, as in Plato, Aristotle, the Stoa, and even 'Dionysius Thrax,' dual patterning (or double articulation) appears again (pp.120–23, 131, 165; though in all these appearances it is usually really triple: letters make syllables, syllables make words, words make sentences). So also do the arbitrariness of the sign—and of grammatical gender (pp.145–53, 187–89)—and the four transformations (or *pathē* 'diseases'), or at least two of them, 'addition' and 'subtraction' (pp.161–68). The notion of positing an abstract underlying form, from which the correct form is derived (usually by a 'substitution'), which appeared in 'Dionysius Thrax' for the verbs in -mi (so that, e.g., *titheō* or *tithō* underlies *tithēmi*), occurs here (p.195) in an abstract nominative *kys* (rather than the real nominative *kyōn*) for the declension of 'dog'—*kynos*, *kyni*, *kyna*, etc.

An example of an inflectional rule criticized by Sextus ('Dionysius Thrax' gives no noun declensions or rules for declining nouns) is this (p.222): 'every simple noun ending in accented *-ēs* will necessarily take the genitive in *-ous*, not *-ou*.' Actually this is a good rule, except that all such words are regarded as compound adjectives (or proper names), and a much more general rule can be formulated in other ways, but Sextus attacks it anyway. One of Wouters's papyrus fragments (not, presumably, from a *Technē*, but a work on noun-inflection—his B1 of II-III AD) deals with such rules in a similarly skeptical way. Herodian, the son of Apollonius Dyscolus, wrote a treatise on nominal inflection (in *Grammatici Graeci* III, II: 2) which is perhaps contemporary with this papyrus, but no earlier treatments of Greek noun-declension are known.

One more argument in Sextus is concerned with the definition and partition of *grammatikē*: he quotes Dionysius Thrax (essentially the first paragraph of 'Dionysius Thrax') and compares his definition unfavorably with a number of others. It is quite clear that that definition comes from an earlier era, agreeing closely with the earlier sketch of the contents of the school curriculum in the fourth century (see *Plato and His Predecessors*). Dionysius lists six parts: reading (as practiced in Plato's day, surely), explanation according to the figures of speech (Socrates in the *Protagoras*), study of *glossai* (rare words) and *historiai* (probably mythology) as mentioned by Aristotle, etymology (as practiced in the *Cratylus*), calculation of analogy (i.e., determination of inflectional type, as just discussed), and literary criticism. As many people have observed, 'Dionysius Thrax' treats almost none of these topics, except for pronoun declension and the conjugations of verbs. Sextus quotes Dionysius' division twice, once (*Adv. Math.* I: 57) at the beginning of his treatment of grammarians, and again (250) at the beginning of the discussion of the 'historical' part of grammar, making it obvious that these six parts are not what real grammarians deal with. He cites critiques by Ptolemy the Peripatetic, Asclepiades, Chares, and Demetrius Chlorus, from whom he derives a three-part analysis of grammar, into the historical section, the technical section (modern 'grammar'), and the special or explanatory section (essentially 'Classical Philology,' writing commentaries on ancient poets and prose writers). But there is one new part to the technical section in Sextus, not yet present in Dionysius or in the Greek papyrus fragments, but to be found in Herodian, a section (169–75) on spelling (*orthographia*), which is made necessary by the very changes in pronunciation which Sextus had noted in the phonology section. He mentions it already in his definition (pp.91–92) of the *technikon* part of grammar: phonology, parts-of-speech, orthography, correctness (*hellēnismos*), and syntax (specifically government and agreement—*ta akoloutha*). The actual problems he discusses in orthography concern the distinction between *i* and *ei* (both [i] now) and between *s* and *z* before *m* (both [z]), plus two questions about syllable division (referring, perhaps, to the proper place to divide a word at line-end). The last kind of question could arise at any time, but the first occurs only when two different spellings correspond to one pronunciation, a condition much more prevalent in the second or third centuries AD than in the first or second BC. In Latin it also arose before the third century AD and led to the same result. As for syntax, though Apollonius had already dealt with it at length, Sextus (209–16) gives only one real example, a nominative absolute construction, which clearly represents contemporary usage.

Sextus Empiricus, in a sense, represents the last fling of original thought in Greek linguistics; after him the grip of tradition on the Greeks becomes complete, and it is only among the Latin grammarians, like Priscian, that independent linguistic thought can be found.

Bibliography

Apollonius Dyscolus *The Syntax*. In: 1981 Studies in the History of Linguistics, vol. 23. Benjamins, Amsterdam (Transl. and commentary by Householder F W).

Ax W 1986 Quadripartita ratio: Bemerkungen zur Geschichte eines aktuellen Kategoriensystems (*adiecto–detractio transmutatio immutatio*). *Historiographia Linguistica* **13**: 191–214

Baratin M 1978 Sur l'absence de l'expression des notions de sujet et de prédicat dans la terminologie grammaticale antique. In: Collart J (ed.) *Varron, grammaire antique et stylistique latine*. Les Belles Lettres, Paris

Baratin M, Desbordes F 1986 La 'Troisième partie' de *l'ars grammatica*. *Historiographia Linguistica* **13**: 215–40

Benedetto V di 1958–59 Dionisio Trace e la techne a lui attribuita. *Annali della Scuola Normale Superiore di Pisa*, ser. II **27**: 169–210; **28**: 87–118

Desbordes F 1983 Le schéma 'addition, soustraction, mutation, métathèse' dans les textes anciens. *Histoire-Epistémologie-Langage* **5**: 23–30

Dionysius Thrax 1883 In: Uhlig G (ed.) 1883 Ars Grammatica. *Grammatici Graeci*, vol. I. Teubner, Leipzig

Gentinetta P M 1961 *Zur Sprachbetrachtung bei den Sophisten und in der stoisch–hellenistischen Zeit*. P G Keller, Winterthur

Herodianus Technicus *Reliquiae*. In: Lentz A (ed.) 1868 *Grammatici Graeci*, vol. III, pt. 2. Teubner, Leipzig. Repr. 1965 Olms, Hildesheim

Householder F W 1989 Review article on Taylor 1987. *Historiographia Linguistica* **16**: 131–48

Koller H 1958 Die Anfänge der griechischen Grammatik. *Glotta* **37**: 5–40

Pfeiffer R 1968 *History of Classical Scholarship*. Clarendon Press, Oxford

Pinborg J 1974 Classical antiquity: Greece. In: Sebeok T A (ed.) *Current Trends in Linguistics*, vol. 13. Mouton, The Hague

Priscian (Priscianus) 1859 Institutiones Grammaticae. In: Keil H (ed.) *Grammatici Latini*, vol. III. Teubner, Leipzig

Robins R H 1986 The *Technē Grammatikē* of Dionysius Thrax in historical perspective. In: Swiggers P, Van Hoecke W 1986

Robins R H 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Schenkeveld D M 1982 Studies in the History of Ancient Linguistics, 1. *Mnemosyne* **35**: 248–68

Steinthal H 1890–91 *Geschichte der Sprachwissenschaft bei den Griechen und Römern*, 2nd edn. Berlin

Swiggers P, Van Hoecke W (eds.) 1986 *Mots et parties du discours: La pensée linguistique*, vol. 1. Leuven University Press (Peeters), Leuven

Swiggers P, Wouters A 1989a Langues, situations linguistiques et réflexions sur le langage dans l'antiquité. In: Swiggers P, Wouters A 1989b

Swiggers P, Wouters A 1989b *Le langage dans l'antiquité. La pensée linguistique*, vol. 3. Leuven University Press (Peeters), Leuven

Taylor D J 1986 Rethinking the history of language science in classical antiquity. *Historiographia Linguistica* **13**: 175–90

Taylor D J (ed.) 1987 *The History of Linguistics in the Classical Period*. Benjamins, Amsterdam

Vervaecke G 1989 Logodaidaloi: La critique du langage dans la Grèce classique. In: Swiggers P, Wouters A 1989b

Wouters A 1979 *The Grammatical Papyri from Graeco–Roman Egypt: Contributions to the Study of the 'Ars Grammatica' in Antiquity*. Koninklijke Academië voor Wetenschappen, Letteren en Schone Kunsten van België, Brussels

Varro and Early Latin Language Science

Daniel J. Taylor

The *Ars grammatica* 'Grammar' became enshrined in intellectual history as the first of the *Artes liberales* 'Liberal Arts.' At first, however, the Romans' interest in language science was rather modest and addressed itself to orthographical, etymological, and literary matters. Such interest was enhanced during the second and first centuries BC by increased intellectual intercourse with the Greek world, in part due to the diaspora of Greek scholars from Alexandria. But Romans invariably adapt, alter, and recast rather than simply borrow. Thus Varro (116–27 BC) dominates early Latin language science and transforms it from a Greek legacy into a typically eclectic Roman one, which reaches us via the later monumental tradition of Roman grammar. The early developmental stage of Roman linguistics therefore commences with the beginning of literary activity in the third century BC and concludes with the death of Varro, an event contemporary with the founding of the first public library in Rome, by which time the formal study of language qua language was an autonomous endeavor and a permanent fixture in intellectual history.

1. Pre-Varronian Grammatical Scholarship

The linguistic and literary milieu of early Rome is more diverse than usually supposed. Rome's first poet, Livius Andronicus (fl.240 BC), is actually a Greek, and his first composition is a Latin translation of the *Odyssey* in verse (the archaic but native Saturnian meter), executed not for literary but for didactic purposes: his Roman students had nothing to read in their native language. Prose records do not much antedate poetic activity, and later authors criticize their dryness and lack of style. The father of Latin literature is Ennius (239–169 BC), who proudly notes that he has three souls because he speaks Greek, Latin, and Oscan. Plautus (250–184 BC), whose comedies abound with *figurae etymologicae* and other linguistically subtle devices, even includes some Punic, the language spoken at Carthage, in one of his plays. A later authority suggests that the Muses would employ Plautine diction should they wish to speak Latin, and we may well concur if the language of the *Senatus consultum de Bacchanalibus* (186 BC) is at all representative of the contemporary language.

All these early documents, literary and nonliterary, are characterized by vagaries of spelling, morphological vacillation, and linguistic diversity of an unselfconscious sort, and consequently Rome's first linguistic arguments or debates—between Lucilius (180?–102 BC) and Accius (170–90? BC)—focus on orthography and spelling reform. Accius' attempt to signal long syllables by doubling the vowel is actually adopted in some inscriptions. In the middle of the second century BC the formal study of language arrives in Rome in the person of Crates of Mallos, a Stoic scholar and on this occasion a Greek diplomat. While recuperating from a broken leg, Crates lectured on linguistic topics—which ones we do not know—and this event, according to a later source, is the origin of grammatical science in Rome. Whether the anecdote is true is debatable, but it is a fact that Rome produces its first bona fide philologist in the next generation, Lucius Aelius Stilo, who is renowned for his scholarship: interpretations of and commentaries on hymns and legal documents, editions of poetry, speeches, and etymological explanations. His major acclaim derives from his attempt to separate spurious from genuine Plautine comedies, but his scholarly activity is obviously influenced by that of Alexandria (Stilo was supposedly personally acquainted with Dionysius Thrax).

Consequently, by around 100 BC the major formative influences on Latin language science are present in Roman intellectual circles: a literary tradition, which is essentially bilingual; dialect mixtures, both horizontal and vertical, and an awareness of linguistic diversity; an educational system emphasizing reading and writing and attending consciously to matters of form, e.g., spelling, and of style; and a more than passing acquaintance with Greek linguistic and philological scholarship in both its Stoic and Alexandrian versions. Thus the literary *opera* of most early Latin authors become the subjects of philological commentaries and the objects of linguistic studies in schools, and the pace of such activity demonstrably accelerates, so much so that the anonymous author of the *Rhetorica ad Herennium*, probably datable to the 80s, intends to compose, but apparently does not, an *Ars grammatica* (this is the earliest reference in Latin to a grammatical manual). The stage is therefore set for the appearance of Rome's first and arguably its most original linguistic theoretician and practitioner.

2. Varro's Linguistic Works

Varro is a scholar's scholar, distinguished, prolific, and blessed with a consuming intellectual curiosity as extensive as learning itself, but his first love and the explicit or implicit subject of almost everything he writes is the Latin language. Of his voluminous scholarly corpus, at least ten major works deal directly with linguistics: *De antiquitate litterarum*, *De origine linguae Latinae*, *De similitudine verborum*, *De utilitate sermonis*, *Peri Kharakteron*, *De sermone Latino*, *De lingua Latina*, *Quaestiones Plautinae*, *Epitome de lingua Latina*, *Disciplinarum liber I de Grammatica* (chronological list from Collart 1954: 30). Varro is responsible for ranking grammar as the first of the liberal arts, and Varro is the most frequently cited authority in all subsequent Latin grammatical literature. Unfortunately and despite the praise lavished upon him by contemporaries and successors alike, most of what Varro wrote has been lost, but fortunately six books or chapters (out of an original 25) of his *magnum opus*, the *De lingua Latina* (LL), are extant. The LL has been edited many times since its rediscovery in the Renaissance and has engendered much scholarship: scholars are fully conversant with Varro's use of sources, scholarly methods, grammatical expertise, etymological practice, and linguistic theory.

The LL is divided into three major sections on etymology, morphology, and syntax. That on syntax is lost, but the one longish fragment extant suggests that it was syntax in the Stoic sense, i.e., propositional logic. Varro addresses his other two topics from a theoretical perspective first and then from a practical one, but only the books on etymological practice (5–7) and morphological theory (8–10) are extant. The contents of the LL and the titles of Varro's lost works suggest that he is interested in both diachronic and synchronic linguistics, in prescription as well as description, in pragmatics as well as in more elevated, literary discourse, and in both heuristic and explanatory procedures. He, more than his predecessors, begins the process of calquing Greek grammatical terminology and of creating new technical terms in Latin. Taken collectively, his etymologies constitute, *de facto*, an encyclopedia of such knowledge, which is repeatedly consulted by his successors, and his morphological analyses serve as the point of departure for the establishment of, inter alia, declensions and conjugations in Latin grammar.

3. Varro's Linguistic Theory

The word is the atomic prime of language and, therefore, of linguistics for Varro. Words are of two sorts, those which vary in form and those which do not. Morphological variation or *declinatio* is likewise a binary process, for words may change form in accordance with either the arbitrary *voluntas* ('will') of speakers or the systematic *natura* ('nature') of language. *Declinatio voluntaria* is thus Varro's term for derivational morphology, *declinatio naturalis* is inflectional morphology, and Varro is the first grammarian, Greek or Roman, to make such a distinction. *Declinatio* is a linguistic universal and is the creative process whereby language increases itself. The language scientist investigates *declinatio voluntaria* via etymological analysis, which explains relationships between sound (or spelling) and lexical meaning, whereas relationships between sound (or spelling) and grammatical meaning constitute the domain of linguistic inquiry on the level of *declinatio naturalis*.

Varro inherits a number of taxonomies from Greek language science, e.g., the canonical parts of speech with their relevant accidence (along with some irrelevant data as well, given the Greeks' failure to distinguish between derivational and inflectional morphology), but, generally speaking, he eschews such matters and treats morphological theory as a *tabula rasa*. Consequently the criteria for determining linguistic similarity or *similitudo* on the level of *declinatio naturalis* are for him two and only two in number: *figura* or *vox*, i.e., phonological form (sound or spelling) and *materia* or *res*, i.e., grammatical substance, e.g., case, tense, etc., and thus in order to be legitimately compared and classified together, words must manifest an *analogia* ('analogy') which is *duplex et perfecta* ('twofold and perfect'). Varro formulates a series of arithmetical proportions in order to explicate his conception of grammatical analogy. Nouns declined alike are similar to a disjoined proportion; so, *rex*:*regi*: :*lex*:*legi* as 1:2: :10:20. Verbs conjugated alike are similar to a conjoined proportion; as 1:2: :2:4, so *legebam*:*lego*: :*lego*:*legam*, for the past is to the present as the present is to the future. Varro is the only ancient language scientist to formulate abstract models.

By comparing words on the basis of their phonological form and morphological substance Varro determines that there are only four *partes orationis* ('parts of speech'): those with case, those with tense, those with both, and those with neither. Further comparison reveals that nouns can be classified into five paradigmatically identical sets and verbs into three, and these sets, however embryonic, are the first declensions and conjugations in Western linguistics. It takes the Roman grammatical tradition centuries to sort out all the details of declensional and conjugational affiliations, but the declensions and conjugations of Latin are all present, at least in theory, in Varro's *De lingua Latina*.

Varro's linguistic theory encompasses all the words in the Latin language, accounts for arbitrariness and systematicity in language, and insists that grammatical analysis can be defined in terms of principles and procedures, which when applied can disclose the presence in Latin of heretofore undiscovered classificatory schemata. Varro's theory also embraces *consuetudo* ('usage'), for he is aware that speakers (and writers) sometimes deploy the linguistic system unsystematically. The fact that Varro adopts a theoretical stance vis-à-vis linguistic data is significant in itself, but that he manages to create grammatical knowledge by applying it is even more significant.

4. Varro's Grammatical Methods

The unscientific procedures of ancient etymology and the many fanciful etymologies produced thereby would seem to suggest that the only constraint upon an etymologist is that imposed by the limits of his own ingenuity, but that is not quite the case with Varro, whose methods are rather principled. He derives Latin words from other Latin words, including dialectal variants, rather than from Greek ones, cites archaic documents in support of earlier attested forms (e.g., *bellum* ('war') from *duellum*), and even reconstructs unattested forms to explain aberrant synchronic forms (e.g., **esum* for *sum* 'I am'). He uses *radix* ('root') to describe words from which others are derived but which are not themselves derived from other words, a usage somewhat anticipatory of our modern one but without precedent in antiquity. He does not etymologize words *ex contrariis* ('on the basis of their antonyms') (e.g., *lucus a non lucendo* 'grove, from not being light'). Varro understands that language changes over time—language *est in motu* as he puts it—that there are different levels or degrees of etymological validity, and that not all etymologies can be discovered. Varro's etymological methods are therefore, for the times, decidedly enlightened.

Exactly how Varro organized and described Latin morphophonemics in books 11–13 of the *De lingua Latina* is not known, but the theoretical books, especially book 10, provide some insights into matters of terminology and methodology. *Analogia* means 'proportion' first and foremost, and so Varro's arithmetical models are a logical consequence of his etymologically-trained mind. But Varro also uses *analogia* and its antonym *anomalia* as cover symbols for linguistic, specifically paradigmatic, regularity and irregularity respectively, and thus Varro frames his analysis of Latin morphology within the context of a search for analogy and anomaly. (It is currently deemed unlikely that there ever was an intellectual quarrel between analogists and anomalists, since the only evidence for such a quarrel is the structure of books 8 and 9 of the *LL*.) Varro's terms and procedures are therefore more heuristic than descriptive or taxonomic. Since *analogia* is a matter of *natura* and *anomalia* of *consuetudo*, the linguist must be prepared to discover both systematic and asystematic features of language. It is not a matter of one or the other but of both.

The fundamental method of determining *similitudo* ('linguistic similarity') is that of comparison, and Varro is the first grammarian to exclude lexical meaning from that endeavor and to focus exclusively on sound and grammatical meaning. Comparison and its logical concomitant, classification, are the tasks which Varro essays. He formulates binary oppositions which progressively delimit or circumscribe the domain of legitimate grammatical inquiry: inflected vs. uninflected (*nox* 'night,' an inflected word, cannot be compared with the uninflected *mox* 'soon'); *declinatio naturalis* vs. *declinatio voluntaria* (principles of inflection and derivation are not comparable); and, for example, declined vs. conjugated (*suis* 'of a pig' and *suis* 'you are sewing' are not comparable either). Such oppositions are fundamental to Varro's thinking and are predicated on what we might call distinctive features of inflection, the most prominent of which is that between case and tense. Plus case and minus tense is one *pars orationis* for Varro, etc., and the search for *similitudo* and hence *analogia*, in the sense of classification, is thereby restricted to one part of speech or another. Varro is particularly sensitive to false *analogia* based solely on phonological *similitudo*: *nemus* ('grove') and *lepus* ('hare') are not similar because they differ in gender, a sometimes covert grammatical category, and this difference precludes *analogia*; but the linguist will not discover the truth unless he examines the full declension of the nouns (+case, −tense)—they will differ in the ACC SG and in both NOM and ACC PL—and/or the determiners with which they co-occur—the one will require *hic*, the other *hoc* in the NOM SG, for example. Such attentiveness on Varro's part suggests that his predecessors and peers were not as scientific as he and presupposes a rudimentary conception of morphophonemics, as witnesses also his use of *exitus* ('desinence').

Varro has at his disposal much inherited terminology, but even here he exercises a specious independence, preferring, for example, *casus nominandi* ('the case of naming') and *casus dandi* ('the case of giving') to nominative and dative. The ablative, which does not exist in Greek, he calls the *casus sextus* ('sixth case'), which is *proprius Latinus* ('unique to Latin'), and both expressions remain as synonyms for *ablativus* throughout the Roman *Ars grammatica*. The ablative figures prominently in Varronian linguistics, for its endings in the singular allow him to classify nouns (and adjectives—the ancients did not distinguish the two, for their forms are identical) into what are now called 'declensions.' Likewise the 2 SG ACT PROG IND PRES endings of verbs provide the basis for his conjugations. Varro has no inherited term for declensions (the Greek grammarians never succeeded in identifying the declensions in their language), and Greek *suzugia* ('conjugation') is a part of verbal accidence; so he coins the term *ordo* (pl *ordines*) to refer to both declensions and conjugations, and that term also continues in use long after his time.

Varro says much less about verbs (−case, +tense) than nouns, but his methods are clearly the same. A binary opposition between personal and impersonal verbs is fundamental, but the two classes share forms for interrogative and declarative indicative, subjunctive, and imperative. Again his terminology is rudimentary—'asking, responding, wishing, commanding'—and indicates that the metalanguage of linguistics is only beginning to be differentiated from that of intellectual discourse in the Roman world. The most significant of the verbal binary oppositions which Varro adduces is that of aspect, between *infectum* ('incomplete or progressive') and *perfectum* ('complete or perfective'). The Stoics (see *Aristotle and the Stoics on Language*) had first and most successfully analyzed aspect in Greek—exactly how we do not know—but since Greek and Latin employ aspect differently, Varro must creatively adapt the Stoic analysis of aspect to Latin. Perhaps his greatest measure of success is the fact that he and he alone of all Roman grammarians identifies the FUT PERF IND, the forms of which are for the most part indistinguishable from those of the PRES PERF SUBJ in Latin. Whether his discovery is due to the application of his arithmetical model (see above) or to his passion for symmetry (PRES, PAST, and FUT *infectum*, and therefore PRES, PAST, and FUT *perfectum*) is moot, but without his understanding of verbal aspect that discovery is unlikely to have occurred.

Varro's search for paradigmatic regularity leads him to postulate three levels of *analogia*. The first is defined as the 'similar inflection of similar words,' the second as the first with the qualification 'so far as customary usage does not object,' and the third as the second with the additional qualification 'to a certain extent.' The definitions are intended for, respectively, the speech community as a whole, individual speakers, and poets. The first two definitions have been compared with *langue* and *parole* as well as with competence and performance, respectively, but the third definition should remind us that Varro is an ancient Roman grammarian, not a modern linguist. Yet these definitions also suggest that Varro has elevated language science to a level of unprecedented theoretical rigor and has significantly advanced the discipline's terminology and methodology.

5. Varro's Legacy

Varro's accomplishments in both etymological practice and morphological theory are many, but they are difficult to characterize, due in part to the loss of so much of what he wrote and partly to the fact that none of his works ever achieved textbook status in the Roman educational system, which was to become almost equivalent to Rome's linguistic tradition. That tradition never forgets its debt to Varro, however, though it never specifies that debt either. Suffice it to say that the quality of Varro's etymologies and the cogency of his linguistic theory make grammar a more scientific and a more autonomous endeavor and therefore a fit companion for logic and rhetoric in the ancient intellectual hierarchy. After Varro, grammar is the first of the liberal arts, and grammatical acumen is the hallmark of an educated individual. Varro himself becomes the first figure of *auctoritas* 'authority' in Roman language science, and to that extent he is responsible for establishing the Roman grammatical tradition itself.

6. Varro's Contemporaries

The grammatical works of Varro's contemporaries are as lost as most of his, but their activity seems to have been less theoretical. Sisenna, Antonius Gnipho, and even Julius Caesar invoke a prescriptive version of *analogia* designed to reform and purify the Latin language. Philoxenus, a masterful Greek etymologist, probably influences Varro. Poets like Catullus and Lucretius are not averse to including grammatical material in their compositions. Nigidius Figulus writes recondite Pythagorean commentaries combining grammar and literary criticism. Greek scholars like Dionysius of Halicarnassus, a rhetorician, and grammarians such as Tryphon, Tyrannion, and maybe even Didymus take up residence in Rome and continue their work. Despite the unsettled political climate, it is clear that first-century BC Rome is a lively intellectual environment, especially insofar as language science is concerned, and what we do know about it and its many practitioners (see Rawson 1985) unmistakably establishes Rome as the new center of intellectual power in the ancient world. That the Augustan golden age of Latin literature commences roughly with the death of Varro may not be unrelated to the wealth of linguistic knowledge either imported or created by him and his fellow grammarians.

Bibliography

Collart J 1954 *Varron grammairien latin*. Les Belles Lettres, Paris

Dahlmann H 1932 *Varro und die hellenistische Sprachtheorie*. Weidman, Berlin

Funaioli G (ed.) 1907 *Grammaticae Romanae Fragmenta*. Teubner, Leipzig

Hovdhaugen E 1982 *Foundations of Western Linguistics:*

From the Beginning to the End of the First Millenium AD. Universitetsforlaget, Oslo
Pfaffel W 1981 *Quartus Gradus Etymologiae. Untersuchungen zur Etymologie Varros in De Lingua Latina*. Hain, Königstein
Rawson E 1985 *Intellectual Life in the Late Roman Republic*. Duckworth, London
Taylor D J 1974 *Declinatio. A Study of the Linguistic Theory of Marcus Terentius Varro*. Benjamins, Amsterdam

Roman Language Science in the Early Empire

Daniel J. Taylor

During the early Roman Empire, roughly 27 BC–200 AD, grammatical activity becomes ubiquitous, providing employment for its professionals and attracting attention from the educated elite, poets, men of letters, and even emperors themselves. The period witnesses the publication of the first Latin lexicon and the first *ars grammatica* in its technical sense of 'grammatical manual' as well as works on more traditional topics like orthography. Etymology becomes a common resource to be employed wherever appropriate, e.g., in definitions, rather than a self-contained area of expertise, but language science expands to include the virtues and vices of speech.

This, then, is the period when the Roman grammarians do what Romans do best, namely, organize, but it is also a period from which precious little grammatical literature has survived. Quintilian, the master rhetorician and holder of the first scholarly chair in Western education, is arguably the leading intellect of the time. In his monumental tome on the art of rhetoric Quintilian includes a sketch of the grammatical curriculum as he either knows it or thinks it ought to be structured, and this text provides the best evidence for the nature and extent of early imperial grammatical inquiry. With the advent of the third century AD, Roman grammar is a *fait accompli*, both a well-defined scholarly discipline and the heart and soul of the educational system, and it was destined to remain as such throughout history.

1. The Status of Grammar

By attending publicly to grammatical details in his own speaking and writing, the emperor Augustus affirms the value of such technical matters, and by dedicating the temple of Palatine Apollo along with its attached library (28 BC), he likewise validates both literature and the study of literature. The emperor's actions also testify to the two special provinces of the Roman *ars grammatica*: the *ratio loquendi* 'art of speaking correctly' and the *enarratio auctorum* 'interpretation of authors.' Both these endeavors had been practiced by Greek grammarians, but the Romans formalize them. Moreover, although some Roman grammarians specialize in one or the other, most claim both technical and exegetical expertise.

In the middle of the first century AD grammar commands the attention of Pliny the Elder and garners the opprobrium of the philosopher Seneca. Pliny's *Dubius Sermo* examines irregular word forms from the perspective of prescriptive analogy. Seneca inveighs mightily against grammar, which he reductively refers to as the analysis of syllables, attentiveness to words, accounts of myths, and principles of versification, and thereby unwittingly verifies that grammar has become a decidedly influential component of the Roman intellectual scene. At the end of the century grammar and grammarians earn a degree of literary eminence, at least of a sort. Martial enjoins his third book of epigrams not to fear Probus, the foremost grammarian of contemporary Rome, and piously hopes that his poems may prove pleasing to grammarians without, however, requiring their professional scrutiny. Juvenal satirizes women who display their grammatical erudition at dinner parties (*Sat.* VI. 434–56). The women and, it may be inferred, their grammatical sources discuss literature and compare Latin and Greek poetry. They indulge themselves in logical syllogisms and *historiae*, the often obscure details, especially mythological, embedded in literary texts and the stuff of which pedantry consists. They consult Palaemon's grammatical manual (see below), cite its rules and prescriptions, quote antiquarian verses, and chastise solecisms. All of this is too much for Juvenal, but it is instructive for historians of linguistics. Martial's testimony avers that contemporary as well as antiquarian poetry is at the mercy of the grammarians' strictures, and although some grammarians are said to receive extravagant salaries or honoraria, Juvenal goes out of his way to commiserate with their financial woes.

Attention to grammar and grammarians continues unabated in the second century AD. Twenty-four chapters or paragraphs of Suetonius' *De grammaticis* remain. These biographical sketches of famous grammarians feature gossip and anecdotes, beginning with Crates of Mallos, whose visit to Rome in 168(?) BC commences grammatical scholarship in the eternal city, and concluding with Probus and Palaemon, who, judging from contemporary literary references and citations in the later grammatical tradition (see *Roman Ars Grammatica, including Priscian*), are the two most important grammarians of the early empire. More than 60 percent of the topics addressed by Aulus Gellius in his *Noctes Atticae*, a miscellany of contemporary lore and learning, have to do with grammar. Etymologies abound, as do references to parts of speech, *Formenlehre*, analogy, orthography, literary and textual criticism, *Latinitas*, and so forth. Gellius' rambling ruminations on grammatical topics offer a vivid picture of grammar's status as the science of sciences.

2. Grammarians and their Texts

Grammatical texts dating from the early empire are few and far between, and so their contents must be inferred from titles, fragments, and citations in later texts. Inspired by Rome's new library and the immediately recognized brilliance of Augustan poetry, Hyginus and Modestus produce commentaries, while Pomponius Marcellus, a captious critic of the worst sort, upbraids even Tiberius' speech, arguing that the emperor is capable of granting citizenship to men but not to a word. The first major linguistic treatise of the period is Verrius Flaccus' *De verborum significatu*, which seems to have been as much encyclopedia as lexicon, and its loss is especially regrettable. The same author's *De orthographia* serves as the primary source for later treatments of orthography.

The major scholar of the age and its most famous grammarian is Quintus Remmius Palaemon. Despite his depraved sexual appetites, which according to the emperors Tiberius and Claudius made him morally unfit for educating the youth of Rome, Palaemon is as popular (cf. his role in Juvenal's satire as discussed in Sect. 1) as he is influential (he is the first grammarian to have grammatical treatises spuriously ascribed to him). Our knowledge of Palaemon's version of Roman language science, however, is indirect only and extremely limited at best; this is particularly vexing because Palaemon has traditionally been credited with (a) authorship of the first *ars grammatica* in and for Latin; (b) substituting the interjection for the article, which Latin lacks, in the *partes orationis* 'parts of speech'; (c) discovering the Latin declensions and conjugations; and (d) organizing Latin grammar into the form in which it is found several centuries later. Our meager evidence for these claims derives from various sources, including extant fragments, Juvenal's testimony, and most notably Quintilian's grammatical sketch, which is thought to be based to some degree on Palaemon's *ars grammatica*.

Palaemon's *ars* is certainly the first known of, and since it is his definition of the interjection which predominates in subsequent grammatical literature, he is most probably the one who substitutes the interjection for the article. The extant fragments of Palaemon's *ars* also suggest that its major contributions to progress in language science are concentrated within the sphere of the uninflected parts of speech, for they deal almost exclusively with the adverb, preposition, conjunction, and interjection. Palaemon's role in determining declensional and conjugational affiliations is less obvious. If he was Quintilian's teacher, as one source claims, his student seems never to have understood the significance of assigning nouns to declensions and verbs to conjugations, for Quintilian is uniformly silent about such affiliations even though he has ample opportunity—and, given some of the linguistic problems he addresses, he needs but is apparently not able—to refer nouns and verbs to declensions and conjugations respectively. Moreover, the later tradition manifests little uniformity either in the enumeration of declensions or in the basis of assigning nouns to declensions, and vacillates between recognizing three or four conjugations. Thus Palaemon's role, if any, in this endeavor seems ineffectual at best, and in any case the declensions and conjugations are already present, at least in theory, in Varro's *De Lingua Latina* (see the preceding article).

The grammatical vignette in Juvenal (see Sect. 1) states that Palaemon's *ars* dealt with linguistic rules, antiquarian verses, barbarisms, and solecisms, and implies that it was both rational and prescriptive. None of this is especially surprising except for the references to barbarisms and solecisms, topics which figure prominently in the later *ars grammatica* under the rubric of *vitia virtutesque orationis* 'vices and virtues of speech' but which have not previously been addressed by Roman grammarians in any formal sense. Such matters are often referred to as the third part (after phonology and morphology) of ancient Latin grammar, and Palaemon may be the first grammarian to have treated them systematically. Exactly what other topics Palaemon essays in his *ars* are not known for certain, but Juvenal's micro-account of Palaemon's *ars* does accord well with Quintilian's more extensive grammatical sketch (see Sect. 3). If Quintilian is dependent upon Palaemon's *ars*, then it would seem to be the model for other *artes* to follow, but the evidence, however tantalizing, is too slim to allow certainty.

Marcus Valerius Probus is the other celebrated grammarian of the first century AD, but the extant works attributed to him are manifestly not by his hand. He is a textual critic and philologist par excellence, and later grammarians frequently cite him as a source when dealing with verbs. The next century witnesses the publication of several treatises on orthography by Terentianus Scaurus, Velius Longus, and Flavius Caper; Terentianus Maurus' manual on metrics is but another indication that literary and linguistic scholarship go hand in hand; and Porphyrion's extant commentary on Horace contains grammatical and lexical information still useful to students and scholars alike. Festus abridges Verrius Flaccus' lexicon, but only the sections on the letters M through V have survived. The trend for ensuing centuries has been set, and later grammarians continue to mine the works of their predecessors. Presumably the nature and scope of Roman language science have also been established by the grammarians of the early empire, but since almost all texts are now missing, twentieth-century scholars are at a loss to specify exactly how that process of organization and formalization actually occurred.

3. Quintilian and Grammar in Roman Education

Given the dearth of specifically linguistic texts, Quintilian's account of the grammatical curriculum in first century AD Roman education looms larger in the history of linguistics than would otherwise be expected. The *Institutio Oratoria* describes Quintilian's ideal of the education required to produce a master orator. As soon as the child has learned to read and write, he begins the formal study of grammar, which Quintilian divides into two parts: *recte loquendi scientia* 'knowledge of speaking (to which he adds writing and reading) correctly' and *enarratio poetarum* 'interpretation of poets.' Quintilian refers to grammar as both a profession (*professio*) and an art (*ars*), and his sketch (I. 4–9) provides the best extant account of what grammarians and their students are doing in the first century AD. The following survey scrupulously adheres to the sequence and general linguistic contents of Quintilian's account but does not indicate the extent to which Quintilian pursues any given topic.

The grammarian first distinguishes between vowels and consonants, dividing the latter into semivowels and stops, and examines the alphabet phonetically. He then examines derivation, especially by prefixes, treating both synchronic alternations in verb roots and diachronic changes, e.g., rhotacism. Next he addresses the number and nature of the parts of speech. Quintilian refers to several competing schemes of enumeration, to which he attaches no significance whatsoever, but it is here that he names Palaemon for the first and only time, classing him and Aristarchus among those who do not differentiate between common and proper nouns. Students must then learn how to decline (*declinare*) nouns and verbs (but note that Quintilian has no word meaning 'to conjugate'), paying special attention to matters of gender, origin of names, and the function of the ablative (which, according to Quintilian, in its instrumental usage is neither a true Latin ablative nor a true Greek dative) in the case of nouns, and in verbs to matters of accidence, ambiguous forms (those which may be either a noun or a verb—Pliny's *Dubius Sermo* may be lurking behind this topic), impersonal passives, and defective verbs (suppletive forms and active impersonals).

Quintilian then turns to style and its virtues and vices, which he treats in terms of words, not sentences. The single virtue is euphony, and the two vices are barbarisms and solecisms. The former are mistakes in individual words and may be classified, in the case of writing, as either addition, subtraction, substitution, or transposition (i.e., the *quadripertita ratio*), and as separation, combination, aspiration, and sound in the case of speaking. Quintilian pointedly remarks that some grammarians may be incompetent to deal with such topics, since they have only entered the *vestibulum artis huius* 'forecourt of this art,' and must therefore restrict themselves to the contents of commonly available *commentariola* 'elementary textbooks.' The art, i.e., grammar, therefore either already encompasses or in Quintilian's opinion should encompass, one is compeled to conclude, the *vitia virtutesque orationis*, and the phonological and morphological matters adduced heretofore do not in themselves constitute a full-fledged *ars* but only a *commentariolum*. Quintilian then addresses a variety of barbarisms commited in writing and speaking; the latter include errors in vocalic quantity and in accent.

Solecisms are errors involving more than one word and may also be classified according to the *quadripertita ratio* with but one exception: substitution is always an error, whereas addition, subtraction, and transposition may be viewed positively as pleonasm, ellipse, and anastrophe or hyperbaton, respectively. Verb usages are especially subject to solecisms, but to how many depends on how one arranges the taxonomy of verbal accidence; thus Quintilian implies that verbal accidence is not a fixed inventory. Solecistic errors involve number, both verbal and nominal, gender, comparatives and superlatives, patronymics and possessives, and diminutives, and occur frequently in the parts of speech, though these latter faults are often, in the case of poets and orators, treated as figures. Quintilian then returns to a threefold binary classification of words originally articulated at the outset of his account of stylistic matters but so far unused: words may be native or foreign, simple or compound, proper or metaphorical. The major question is whether foreign words, particularly Greek nouns, should retain their inflection or should be adapted to Latin. Quintilian's analysis of compounds is nowhere near as sophisticated as that found in ancient Sanskrit grammar, but it is a potentially profitable topic. Neologisms and onomatopoeia obfuscate the distinction between proper and metaphorical usage.

Quintilian then analyzes principled or rule-governed linguistic behavior in speech. Language consists of *ratio* 'reason,' which is a matter of *analogia* especially and sometimes of *etymologia*; *vetustas* 'antiquity,' which adds majesty; *auctoritas* 'authority,' which mainly deals with precedents from oratorical and historical prose because poetic license invalidates much of poetry's *auctoritas* (Quintilian may be uniquely biased on this point); and *consuetudo* 'usage,' which is the surest guide. Analogy is comparison of the unknown with the certain and focuses on final syllables, i.e., endings, and diminutives in order to reveal declension and/or gender. Analogy is useful for determining the quantity of vowels in verb forms, e.g., the infinitive, and for discovering the correct present indicative on the basis of other tenses. Analogy is sometimes inconsistent and in any case is not a divinely ordained phenomenon but a humanly discovered one and therefore, ultimately, a product of usage. Some grammarians go too far, actually altering attested forms in favor of artificially, i.e., analogically, created ones. Since some forms are clearly doubtful, Quintilian concludes that it is one thing to speak Latin, another to speak grammar. Etymology inquires into the origin of words and is useful in definitions and in identifying barbarisms. Archaic words add majesty and charm but should be used sparingly, and despite their textual authority, not all words receive sanctioning. Usage is a tricky issue, for it involves idiosyncratic as well as uneducated habits; Quintilian defines it as the agreed practice of educated men. Rules of writing, i.e., orthography, are discussed next. Difficult cases, diachronic changes, and discrepancies between spelling and pronunciation all require critical judgment on the part of grammarians. Quintilian concludes with a caveat to his readers: such trivial matters are no hindrance to excellence, but grammatical superfluities can become pedantry.

Despite appearances to the contrary Quintilian's account has been remarkably well organized, but he gives no clue as to whether that organization has been imposed by himself or is a product of some unnamed source. That issue is still *sub iudice*. Apart from the matter of organization, Quintilian would appear to be indebted to Varro for much of his discussion of analogy and etymology, to Verrius Flaccus for his account of orthography, and to Pliny vis-à-vis dubious grammatical forms, but he does not say so. At this point Quintilian has finished his sketch of the *recte loquendi scientia* and now turns to *enarratio poetarum*, and the moving rhetoric of his presentation suggests that the passage, at least that part on *lectio* 'reading,' is his own.

Reading is a matter of pausing and breathing, inter alia—it should be remembered that the ancients invariably read aloud (exceptions are noteworthy)—and takes the student into the realm of literature. After the student parses and scans a verse, the professor identifies barbarisms, instances of poetic license, *glossemata* 'uncommon words,' and literary figures. *Historiae* are the next topic, and here Quintilian echoes Seneca's and Juvenal's scorn of such minutiae, concluding that not to know some things is to the teacher's credit. Finally, Quintilian enumerates several additional exercises in composition for those students not yet ready to progress onward and upward in their studies: paraphrases of Aesop's fables, aphorisms, character sketches, and moral essays; such matters are not, however, inherent in grammar proper. Quintilian is now by his own admission done with his sketch of grammar, a topic on which he has not tried to say everything, for it is infinite.

Nonetheless, Quintilian has, in fact, authored the only extant text of its kind datable to the early imperial period. Through him has come the knowledge of what language scientists were doing at the time, and they continue to do much the same thing throughout the next half-millenium. They may elaborate any given topic almost to excess and may vary their organization of the material, but generally speaking, the tripartite table of contents addressed by the later monumental Roman *ars grammatica* tradition—phonology, morphology, vices and virtues of speech—is also grammar as constituted in the *Institutio Oratoria*. To be sure, in time, the grammarians flesh out Varro's embryonic declensions and conjugations and add them to their morphological sections. They even create a new genre of grammatical literature, namely, the grammatical commentary, i.e., commentaries on grammars, and Priscian ultimately incorporates syntax into the *ars grammatica*. But otherwise the form and contents of the Roman *ars* are established in the first century AD, and the result is a discipline and a profession central to Roman life and letters in late antiquity and equally central to those of the late twentieth century.

Bibliography

Barwick K 1922 *Remmius Palaemon und die römische ars grammatica*. Dieterich, Leipzig

Bonner S F 1977 *Education in Ancient Rome: From the Elder Cato to the Younger Pliny*. Methuen, London

Mazzarino A 1955 *Grammaticae Romanae Fragmenta Aetatis Caesareae*. Loescher, Turin

Taylor D J (ed.) 1987 *The History of Linguistics in the Classical Period*. Benjamins, Amsterdam

Apollonius Dyscolus and Herodian

Fred W. Householder

The first ancient grammarian whose more or less complete book-length works have been preserved is Apollonius Dyscolus ('The difficult one'). Of the 59 (or fewer) titles mentioned by Priscian, Apollonius himself, the Suidas lexicon, and others, there are four: *On the Pronoun*, *On Adverbs*, *On Conjunctions*, and *On Syntax*, all in some measure defective. Of these four, the *Syntax* (in four 'books') is the longest and the most interesting to linguists, as well as the best preserved, on the whole. From his son Herodian (Herodianus Technicus, 'Herodian the expert on *Technika*,' i.e., on grammar in the modern sense) nothing complete has survived except quantities of long quotations, sufficient for a very big book, mainly about morphology (inflection in particular) and etymology. These two grammarians have been of enormous influence, and repay careful study. While 'Dionysius Thrax' offers virtually no discussion, analysis, or argumentation, but mainly a technical vocabulary, Apollonius and his son give us a great deal of intelligent discussion, and add not only to our vocabulary but to our understanding of the Greek language.

1. The Syntax

The only predecessor that exists for this is a paragraph or two in Aristotle, especially *Rhetoric* 1407b (see *Aristotle and the Stoics on Language*) where his listing of solecisms implies a number of rules. Most of these reappear in Apollonius (the two that do not are: 'adjectives like *isos* "equal" take the dative' and 'adjectives like *diplasios* "twice as big as" take the genitive'), but they are not really stated as rules here, either. Aristotle implies that the relative pronoun agrees with its antecedent in gender and number; Apollonius implies this in remarking (*Syntax* 1.148(88)) that it does not agree in case. Aristotle implies that the subject of a finite verb is in the nominative case; Apollonius (*Syntax* 1.17(12)) implies the same thing, and indeed frequently uses 'nominative' to mean 'subject.' Aristotle contrasts this with the subject accusative of the infinitive; Apollonius cannot say this any better than Aristotle, but does promise (1.51(32)) to investigate the reason why it is so. Aristotle clearly implies that the predicate with verbs like *be* agrees with the subject; Apollonius in several places comes close, but does not make it as clear as Aristotle. He does, however, have names for these verbs: *huparktikai suntaxeis* 'existential constructions,' (3.43(219)) *rhēmata huparxin sēmainonta* 'verbs signifying existence' (1.136(82)). Aristotle several times comments on the objective genitive with nouns like *epistēmē* 'knowledge'—which counts as a 'relative predicate,' *pros ti*; Apollonius (3.189(302)) contrasts such nouns and adjectives with participles, which govern the same case as the verbs from which they are derived. Finally, Aristotle mentions *tuptō* 'hit' and *horō* 'see' as verbs which take an accusative; both are on Apollonius' lists (3.159(283), 3.169(290)).

The notion of syntactical correctness has two common names in Apollonius, *akolouthia* (sequence) and *katallēlotēs* (mutuality), which cover both government and agreement, for which he has no distinct names. Their opposites, the errors *anakolouthon* and *akatallēlotēs*, are also often mentioned. This is the first clear discussion of correctness in syntax found in ancient grammarians.

Two of his failures cannot be overlooked. Both Aristotle and the Stoics were concerned with predicates, but said little about subjects, or indeed about noun phrases (NPs) in general. Apollonius often feels a need for such terms, but has inherited from his predecessors no other device for subject than the term 'nominative case,' and none at all for NP. For his attempts at the NP notion, see his discussion (*Syntax* 2.111) of the sentence from Homer's *Iliad* 16.799–800 'Then Zeus gave it [the helmet] to Hector to wear on his head': 'There are three NPs (*hupokeimena*) to consider here, Zeus, who gave, Hector, [and the head?]; if "to Hector" is deleted, the antecedent of "his" would be "Zeus".' It is not clear what or who the third NP would be, but probably 'his head' rather than 'the helmet' (which occurs in a preceding sentence), or perhaps the 'he' implicit in 'his.' This term, *hupokeimenon*, from Aristotle, becomes in medieval times the Latin *subjectum*, our 'subject.' Another attempt, *prosōpon* 'person' has some use as well. Note at *Syntax* 3.46(220.25) 'Every plural *prosōpon* [NP] consists of several singular *prosōpa*, whether the singular persons are all the same [i.e., all third, all second, all first] or different [i.e., some first and some third, etc.].' This sentence is difficult to say with Apollonius' vocabulary. As usual, all the NPs in his examples here are human beings and so 'persons' anyway.

With regard to 'subject,' where his usual term is 'nominative case' (*eutheia ptōsis*), he has two problems, how to discuss the subject of an infinitive in the accusative and how to describe the predicate nominative with verbs like *be*. The first question comes up in *Syntax* 3.25(207) and 3.86(243–44); in the first passage he says that in the transformation from indicative to infinitive, 'the accompanying nominatives become oblique,' and in the second he says that of two accusatives with an infinitive 'the first accusative in order acquires the active disposition [i.e., the notion of agent].' The subject accusative is then the accusative which has been transformed from a nominative. The other case (predicate nominative) he describes in *Syntax* 1.72(45.15) as 'the accompanying nouns without article,' which will take care of many instances, at least.

Although both Apollonius and his son were *Technikoi*—indeed *Technicus* is a kind of surname for Herodian—neither one wrote anything called *Technē*. But the pattern of the *Technai* (see *Dionysius Thrax, The Technai, and Sextus Empiricus*), starting with some phonology, going on with parts of speech, then each part of speech in traditional order (noun, verb, participle, article, pronoun, preposition, adverb, conjunction), with a listing of all the subclasses and categories relevant to each, is followed in the *Syntax* in a limited way. Instead of just phonetics, all four levels (of the double articulation—phonetics in letters and syllables, syntax in words and clauses/sentences) are treated in terms of the four basic (and more modified) transformations or *pathē* which change the letters in an etymology or the words in a sentence to derive a surface form from a base-form (*Syntax* 1.1–13 more or less). The novelty in the double articulation treatment here is that sentences (*logoi*) are built out of *noēta* 'thinkables' (i.e., abstract entities), not words or parts-of-speech. Apollonius lists six different 'transformations' as applied to letters, syllables, words, and sentences (in a speech, poem, or other work): (a) repetition/reduplication; (b) insertion/addition (pleonasm); (c) deletion/omission (ellipsis); (d) distraction, resolution of compounds, etc.; (e) contraction, compounding, etc.; (f) transposition/inversion (metathesis, hyperbaton, hyperthesis). Apollonius also gives several other parallels between the levels, for example, that just as some vowels tend to precede others (in diphthongs), so some words are prepositive and others postpositive; some letters can be pronounced by themselves (vowels) and some words (e.g., exclamations) can form complete sentences. There are other phonological changes, but they have no analogues at the syllable or word level except deletions and insertions.

After several chapters (1.13–29) proving that the order of letters of the alphabet and the traditional order (given above) of the parts of speech are natural and correct, and six more (30–35) commenting on the fact that all interrogatives are either adverbs (like *how? when? where?* etc.) or nouns (in modern terms pronouns: *who? what?* etc.), Apollonius takes up, not all eight, but only five of the parts of speech: articles (1.37–157), pronouns (Book 2), verbs (including infinitives by definition and occasionally participles, by transformation—Book 3), and prepositions and adverbs (Book 4), including a few conjunctions.

At the beginning of Book 3 (1–49), he has a discussion of solecism, in which various parts of speech are treated. He then proceeds to deal with verbs, and goes well beyond what is known of the Stoics' treatment. They distinguished four main types of verbs: personal intransitive, personal transitive (including verbs which govern a dative or genitive), impersonal intransitive (with meanings like 'it is necessary'), and impersonal transitive (the type is *Sokratei Alkibiadous melei* 'Socrates (dative) cares about Alcibiades (genitive)'). Apollonius gives a lot more information, especially about the 'personal transitive' class, both those which govern an accusative, and those which take a genitive or a dative. Curiously, he confines himself almost entirely to verbs which govern a human or personal NP as object (he mentions the verb meaning 'to read,' but only with a human object 'He read Alcaeus, not Homer')—there is no verb for 'get,' 'take,' 'give,' 'buy,' 'sell,' 'bring,' 'pick up,' etc. He has a long discussion of verbs which occur with dative and also with accusative (3.177, pp. 294–95), but nowhere talks about verbs taking both cases at once, like 'give,' though he gives an analysis (Generative Semantics style) of *legō soi* 'I'm speaking to you' as *logou soi metadidōmi* 'I'm giving you a share of speech,' which actually has dative and genitive at once.

These analyses or abstract underlying strings, which do look very much like Generative Semantic structures, occur all through the book. Dionysius Thrax's use of abstract underlying forms for the *-mi* verbs *tithō, histō, didō*, with more underlying *titheō, histaō, didoō*, is noted in the article *Dionysius Thrax, The Technai, and Sextus Empiricus*, and this practice, to judge by Herodian (see p. 780.32), was widespread in the treatment of declension and conjugation. But Apollonius extended it to inflectional and derivational suffixes (*-idēs* from 'son of,' for example) and whole sentences. The actual surface forms are derived from the underlying structures by the four transformations (and some variants thereof) that run through all ancient linguistic theory: deletion, addition, substitution, and transposition. So to derive *tithēmi* from *titheō* one deletes the *-ō*, lengthens *-e-*, and adds *-mi*. As an example of the 'Generative Semantics' analysis, consider this sentence in *Syntax* 3.177, 294.15: *legō se kleptēn* (I call you a thief) which is analyzed as 'By the sentence which I am uttering, I declare you to have done what can be classed as theft.' Note that 'declare' marks the verb *legō* as being indicative, 'which I am uttering' as present tense, 'to have done' says 'thief' is an agent or active verbal noun, and the rest generalizes the root meaning of 'stealing' or 'thief.' This kind of analysis sounds vaguely Stoic, and Apollonius himself mentions (1.60, p. 31.3) that the Stoics restricted the name 'verb,' (*rhēma*) to the infinitive, since all other forms include additional meanings (*paremphasis*), but the infinitive is *aparemphaton* (without extra meanings). These extra meanings are pure tense [±past], mood, person, and number—though the infinitive does have voice and aspect (including future). A regular Greek transitive verb has ten different infinitives; so the infinitive is not as pure a 'verb' as it would be in English or even in Latin. A little further on (1.51) Apollonius extracts mood, converting *peripatei* (he is walking) to *hōrisato… per-*

ipatein ((someone) declared him to be walking), and *peripateitō* (let him be walking 3 sg imperative) to *prosetaxe... peripatein* ((someone) gave orders for him to be walking), and so on. Similar analyses appear at 3.25(207.5–26) and 3.61(231.7–14).

For the plain reconstruction of an underlying 'ordinary Greek' sentence, see 3.49, where part of the second line of the *Iliad* (*hē myri' Achaiois alge' ethēken* 'which caused the Greeks many woes') is given *to hexēs* (the underlying form) *hē ethēken myria kaka tois Hellēsin* with (presumed) prose order and synonyms for 'the Greeks' and 'woes.' Here two substitutions, one deletion (of the article) and two transpositions would yield Homer's words. However, elsewhere (3.166, 289.2) he says 'One must observe that it is not only poetic license (*poiētikē adeia*) that involves omission (*elleipsis*) of words, but also ordinary speech.' The example under discussion is an explanation of a particular use of the accusative case as involving the obligatory ellipsis of an abstract preposition (a technique very highly developed in Sanctius and later grammarians).

2. Other Works

The other surviving works of Apollonius Dyscolus are three (from a set of eight on the parts-of-speech) on *Pronouns*, *Adverbs*, and *Conjunctions*. While not so exciting for linguists today as the *Syntax*, these are also interesting. The *Pronouns* occupies 116 pages in Schneider's edition (*Grammatici Graeci* II, I), *Adverbs* uses 93 (of which the last 10 really belong to Book 4 of the *Syntax*), and *Conjunctions* 45 (with various gaps and defects). Among the interesting arguments in *Pronouns* is the point (pp.23–24) that subject pronouns in Greek are always contrastive, and another reference (p.52) to verbs of 'existing and being called' governing the nominative (though he doesn't make it crystal clear that there are two nominatives here, a subject and predicate). Most of the book is about matters like spelling, accent, definition, inflection, derivation, and dialect forms. *Adverbs* is a bit more interesting, touching on tense agreement (of adverbs like *yesterday* and *tomorrow*, p.123) the use of negative *mē* with imperatives and subjunctives, but *ou* with indicatives (p.124), and the basic meanings of the accusative and dative (pp.129–130). In *Conjunctions* the main points of interest are the distinction between inclusive and exclusive *or*, the rule (called Attic) for using optative for indicative in secondary sequence, and the fact that *hina* ('so that' of purpose) takes the subjunctive (p.243). Here he does not mention the Attic optative.

3. Herodian

None of Herodian's works is preserved independently, but so much is copiously quoted by later grammarians, especially George Choeroboscus, that it fills two volumes of *Grammatici Graeci* (III, 2). The works in the first one deal with prosody (in the ancient sense), i.e., accents, breathings, and the quantity of *alpha*, *iota*, and *upsilon*—purely from a graphic point of view. But the second contains the *Peri Pathōn* (On the Transformations) which concerns itself with etymological explanation by means of the four transformations discussed above (see the preceding articles), plus a few special subtypes, like contraction, distraction, and reduplication. It also includes the *Peri Orthographias* (*On Spelling*) which deals mainly with choices between *e* and *ai* or *i* and *ei*, which had become homophones, and the *Peri Kliseōs Onomatōn* (*On the Declension of Nouns*).

The Alexandrian grammarians Aristarchus and Aristophanes listed six criteria that are relevant to arguments about analogy, but Herodian, in the first fragment (p.634) of *On Declension* lists ten: (a) gender; (b) noun-type (common, proper, etc.); (c) simple or compound; (d) number; (e) accent; (f) case; (g) derivational ending of penult; (h) syllabic vowel quantity; (i) number of syllables; and (j) consonant clusters (at end of stem or of nominative case). Of course the starting point is the nominative singular form. Some of these criteria may be relevant only to arguments about declension, but many appear in discussions of spelling, where initial vowels, consonants, consonant clusters, and syllables may also play a part. The transformations (*pathē*) and their subtypes play a quite different role in arguments. The best way to make all of this clearer is to quote a handful of examples, some of which also exemplify the appeal to a rule (*Kanōn gar estin ho legōn*, 'for there is a rule which says...') or, in the case of spelling, occasionally, to tradition (*kata tēn paradosin*, 'according to tradition').

(a) From *On Spelling* (p.433): 'All words ending in *mōn* with recessive accent, longer than two syllables, derived from *heima* meaning "clothing" are spelled with the diphthong [i.e., digraph] *ei*, e.g., *lēucheimōn* "white-clad".'

(b) From *On the construction of letters* (i.e., on graphotactics), frag. 16 (p.399): '*hamartō* yields a second aorist *hēmarton* and by transposition (*huperbibasmos*) of *r* and change (*tropē*) of *a* to *o*, and insertion (*pleonasmos*) of *b* ēmbroton.'

(c) From *On Spelling* (p.449): 'One-gender words ending in *phos*, not neuter, uncompounded, not of Latin origin, prefer a simple vowel [not a digraph] in the penult, e.g., *lophos*, *serphos*, *Tēlephos*, etc.'

(d) From *Declension* (p.653): 'Two-syllable nouns ending in *mas* preceded in the penult by a vowel, are inflected imparisyllabically [i.e., the other cases are longer than the nominative singular], like *Thaumas*, *Thaumantos*, etc.'

(e) A rule from *Declension* (p.678) about nouns ending in *ēs*: 'One may say that every monosyllabic nominative [ending in *s*] which is inflected parisyllabically forms its genitive by deletion (*apobolē*) of the *s*, e.g., *ho Grās*, *tou Grā* (a proper name), etc.'

(f) From *On the transformations* (p.272): 'There is a rule (*kanōn*) which says that whenever the second vowel [*i* or *u*] of a diphthong beginning with *a* is lost [*apostasis*], the *a* is then lengthened (*ektasis*), e.g., *klaiō klāō*.'

(g) An anticipation of Grice in *On Nouns* (p.621): 'One may ask why *tis* ("who?") has a short *i*; . . . The one asking wants an answer in a short time, not a long one.'

Of course, by Herodian's day real long vowels had all become phonetically short, so this is a rather abstract explanation.

This discussion closes with a list of the various words for the pathē:

(a) 'Addition' is nearly always *pleonasmos*, but internally it may be *epenthesis*, and if a suffix is involved it may be *epektasis* or *prosthesis* and if a single long vowel or diphthong is made into two ('distraction') it is called *diastasis*, *dialusis*, or *diairesis*.

(b) Initial reduplication is *anadiplasiasmos* or just *diplasiasmos*.

(c) 'Deletion' is *sunkopē* or *ekbolē* internally, *apokopē* finally, also *apobolē*, *aphairesis*, and *huphairesis*, and *elleipsis*. The contraction of two vowels into one is usually called *krasis*, *sunairesis*.

(d) 'Substitution' is usually *tropē* ('turning'), but also *metabolē* or *metathesis* (which looks ambiguous).

(e) 'Transposition' is *huperbibasmos*, *katabibasmos*, *huperthesis*, *metathesis*, and *tropē* (again ambiguous).

(f) 'Lengthening' is *ektasis* or *epektasis*.

(g) 'Shortening' is *sustolē*.

Herodian also provides various words for the base, whether abstract or real, *prōtotupon* (780.32, also used in other senses), *enteles* (921.3, when deletions are performed on it), and the phrase *kath'hupostasin lambanō* 'I assume as base' (830.2). Most interesting is his statement (661.2a–30, in a passage dealing with the vocative) that the nominative is the 'mother' of the genitive (sc. singular) and the genitive is the mother of all other forms.

4. Conclusion

Besides their direct influence, Apollonius and Herodian had a great indirect influence through Priscian, who not only followed them closely, but translated large portions of Apollonius, and even kept many of his Greek examples. Both directly (perhaps) and through Priscian, many of Apollonius' techniques, especially the use of ellipsis, reached Sanctius, whose Latin grammar was, in turn, influential on eighteenth- and nineteenth-century linguists, especially the grammarians of Port Royal.

Bibliography

Apollonius Dyscolus *Scripta Minora*, Schneider R (ed.) In: 1878 *Grammatici Graeci*, vol. II, pt. 1. Teubner, Leipzig. Repr. 1965 Olms, Hildesheim

Apollonius Dyscolus *De Constructione* (*Peri Syntaxeos*), Uhlig G (ed.) In: 1910 *Grammatici Graeci*, vol. II, pts. 2–3. Teubner, Leipzig. Repr. 1965 Olms, Hildesheim

Apollonius Dyscolus *The Syntax*. In: 1981 *Studies in the History of Linguistics*, vol. 23. Benjamins, Amsterdam (Transl. with commentary by Householder F W)

Apollonius Dyscolus *Peri Syntaxeos*, Sylburg F (ed.). Frankfurt (Latin transl. 1590 Portus F).

Ax W 1986 Quadripartita ratio: Bemerkungen zur Geschichte eines aktuellen Kategoriensystems (adiectio–detractio–transmutio–immutatio). *Historiographia Linguistica* **13**: 191–214

Baratin M 1978 Sur l'absence de l'expression des notions de sujet et de prédicat dans la terminologie grammaticale antique. In: Collart J (ed.) 1978

Blank D L 1982 *Ancient Philosophy and Grammar: The Syntax of Apollonius Dyscolus*. Scholars Press, Chico, California

Blank D L 1986 Apollonius and Maximus on the order and meaning of the oblique cases. *Historiographia Linguistica* **13**: 241–57

Collart J (ed.) 1978 *Varron, grammaire antique et stylistique latine*. Les Belles Lettres, Paris

Desbordes F 1983 Le schéma 'addition, soustraction, mutation, métathèse' dans les textes anciens. *Histoire–Epistémologie–Langage* **5**: 23–30

Donnet D 1967 La place de la syntaxe dans les traités de grammaire grecque, des origines au XII siècle. *L'antiquité classique* **36**: 22–48

Egger E 1854 *Apollonius Dyscole, essai sur l'histoire des théories grammaticales dans l'antiquité*. Durand, Paris

Herodianus Technicus *Reliquiae*. In: Lentz A (ed.) 1868 *Grammatici Graeci*, vol. III, pt. 2. Teubner, Leipzig. Repr. 1965 Olms, Hildesheim

Householder F W 1989 Review article on Taylor 1987. *Historiographia Linguistica* **16**: 131–48

Lallot J 1983 L'ellipse chez Apollonius Dyscole. *Histoire–Epistémologie–Langage* **5**: 9–16

Lambert F 1978 Le terme et la notion de *diathesis* chez Apollonius Dyscole. In: Collart J (ed.) 1978

Pfeiffer R 1968 *History of Classical Scholarship*. Clarendon Press, Oxford

Pinborg J 1974 Classical antiquity: Greece. In: Sebeok T A (ed.) *Current Trends in Linguistics*, vol. 13: 69–123. Mouton, The Hague

Priscian (Priscianus) *Institutiones Grammaticae*, Hertz M (ed.) In: Keil H (ed.) 1859 *Grammatici Latini*, vol. III. Teubner, Leipzig

Schenkeveld D M 1982 Studies in the history of ancient linguistics, 1. *Mnemosyne* **35**: 248–68

Steinthal H 1890–91 *Geschichte der Sprachwissenschaft bei den Griechen und Römern*, 2nd edn. F. Dümmler, Berlin. Repr. 1961 Olms, Hildesheim
Swiggers P, Van Hoecke W (eds.) 1986 *Mots et parties du discours. La pensée linguistique*, vol. 1. Leuven University Press (Peeters), Leuven
Swiggers P, Wouters A 1989 *Le langage dans l'antiquité. La pensée linguistique*, vol. 3. Leuven University Press (Peeters), Leuven
Taylor D J 1986 Rethinking the history of language science in classical antiquity. *Historiographia Linguistica* **13**: 175–90
Taylor D J (ed.) 1987 *The History of Linguistics in the Classical Period*. Benjamins, Amsterdam

Roman *Ars Grammatica*, including Priscian

Even Hovdhaugen

The Roman *ars grammatica* comprises Roman grammatical works written between the third and the sixth century AD. They are all intended as textbooks in the schools or as handbooks for teachers. The majority consist of descriptions of Latin morphology focusing on the word classes ('parts of speech'), but many of the works also include treatments of phonology, metrics, and stylistics, which in some instances are taken by the authors as being as important as purely grammatical matters. The standard textbooks of the Roman *ars grammatica* tradition (especially Donatus' two grammars of the fourth century AD) were to form the basis for grammar teaching and grammar writing in Europe for more than a thousand years.

1. Background

The term *ars grammatica* means 'the art of grammar' and is a translation of Greek *téchnē grammatikḗ* with the same meaning. It is also likely that the Roman *ars grammatica* originated from the Greek genre of the *téchnē grammatikḗ*, but owing to the lack of Greek grammatical texts and the dating problems within Greek linguistics, notably the uncertainty of the dating of Dionysius Thrax's *téchnē grammatikḗ*, the exact nature of the connection between the two grammatical traditions remains unclear.

Just as in the Greek world, the Roman grammatical textbooks are basically designed for providing a metalanguage and method for analyzing those literary texts (mainly metrical texts like the works of Homer and Virgil) which were used as the principal textbooks in the schools. Gradually, however, the aim of the grammarians becomes basically linguistic, and literary considerations fade into the background, perhaps due to the increasing divergence between the spoken and written languages and the need for teaching a standardized literary language in the schools. But it may have also been due to the establishment of a well-organized school system and a professionalism among the teachers, who preferred a fixed curriculum.

The works labeled *ars grammatica* cover a wide variety of subjects and approaches to language and, in comparison with the few reminiscences of Greek grammar from antiquity, are impressive both in quality and quantity. The extant grammatical texts, however, represent but a part of the Roman grammatical literature. In some of the works that remain available we find references to grammarians otherwise unknown to us or to grammars now lost. Furthermore, the name of the author of many of the extant works is unknown or uncertain (cf. Kaster 1988 for a well-documented and thorough description of the lives and works of Greek and Roman grammarians). In many instances a grammar is attributed to a famous person known to have written an *ars grammatica* (e.g., Remmius Palaemon (first century AD) or another famous person (e.g., St Augustine (354–430)). It is common for the grammarians to copy each other extensively, often without acknowledging their sources.

All grammars and other linguistic texts by Roman grammarians except Varro (116–27 BC) and Quintilian (35/40–ca.97 AD) have been published by Keil 1855–80. Accordingly, Keil's editions have had a major impact on the study of Roman linguistics. Unfortunately, many of his texts are badly in need of a new textual edition; it must be said that the study of Roman linguistics is seriously hampered by the lack of philologically reliable editions of those texts available (for further literature on the Roman grammatical tradition, cf. Barwick 1922 and Hovdhaugen 1982).

2. The Roman Grammarians

The first extant *ars grammatica* is the work in three books by Marius Plotius Sacerdos (third century AD). The work is badly organized and apparently starts with prepositions and verbs (the manuscript is fragmentary in the beginning). After the parts of speech have been discussed, there is an extensive treatment of the ablative case and a possible seventh case in Latin. The second book is devoted to syllable quantity and phonotactic matters as well as to a classification of stems and words according to their final sounds and syllables. The third book is entirely devoted to metrics.

The African grammarian Flavius Sosipater Charisius (fourth century AD) wrote an extensive *Ars grammatica* in five books, which treats morphology (including an extensive classification of words into inflectional classes), stylistics, and metrics and which also includes a short phonology (i.e., a description of the letters and their pronunciation), a list of synonyms, a list of words with different genders in Greek and Latin, and so forth. A characteristic feature of Charisius' work, and one which is unique in the *ars grammatica* tradition, is that on most controversial points he quotes extensively the views of other authors (many of them unknown from other sources). To some extent his grammar is a compilation or reader of Roman grammatical literature.

Diomedes (third or fourth century AD) wrote an *Ars grammatica* in three volumes, which in many respects follows the arrangement of Sacerdos, except that the second book contains just a short sketch of phonology and then treats stylistics and poetical matters, including cases of correct and incorrect Latin. Furthermore, in contrast to Sacerdos but in line with Charisius, he includes numerous references to and examples from Greek.

The most influential Roman grammarian of the fourth century was Aelius Donatus (fourth century AD), who wrote two grammars: *Ars minor* and *Ars maior*. The *Ars minor* only treats the word classes and is written as a dialog between the teacher who asks and the pupil who answers. The *Ars Major* also includes a short phonology and aspects of correct and incorrect Latin. Table 1 gives a survey of the contents of Donatus's very influential *Ars maior* (of these topics only sections 7–15 are included in the *Ars minor*).

The *Ars grammatica* attributed to Marius Victorinus (fourth century AD) illustrates another type of *ars grammatica*. Victorinus discusses in his preface what grammar should be and stresses the literary nature of his grammar and its importance for literary studies, but limits his treatment to phonology, orthography, and metrical aspects of the syllable. A similar approach is found in the *Ars* attributed to Atilius Fortunatianus (fourth century AD?), which is mainly a book on metrics but which contains in the beginning some short chapters on vowels, consonants, and syllables. Victorinus also wrote a short elementary *ars* in the form of questions and answers (a format that apparently starts with Donatus's *Ars minor* and which becomes very popular in late antiquity and the Middle Ages) but which, unlike Donatus's *Ars minor*, contains a lot of Greek examples, something that may be due to Victorinus being a Christian.

Table 1.

1. On voice
2. On letters/sounds
3. On syllables
4. On metrical feet
5. On accents
6. On punctuation
7. On parts of speech
8. On nouns
9. On pronouns
10. On verbs
11. On adverbs
12. On participles
13. On conjunctions
14. On prepositions
15. On interjections
16. On barbarism (*barbarismus*)
17. On syntactic faults (*soloecismus*)
18. On other errors
19. On irregularities (*metaplasmus*)
20. On rhetorical figures (*schema*)
21. On tropes

Consentius (fourth century AD) and Phocas (fifth century AD) both limited their *Artes* to the noun and verb. Consentius also wrote a separate treatise about grammatical and stylistic errors.

The teaching of grammar beyond the elementary stage usually consisted in the teacher's reading a paragraph from a grammar and then commenting on it. Some teachers published their commentaries, thereby creating an important new grammatical genre and demonstrating the versatility and originality of Roman linguistics. Most influential were the commentaries on Donatus's *Ars maior* by Maurus Servius Honoratus (fourth century AD) and by Pompeius (fifth century AD). Pompeius is especially important since he most clearly represents the semantically oriented approach to grammatical analysis which can already be found implicit in Servius (on whom Pompeius to a large extent based his work) and Phocas and which would prove to be central in Priscian and medieval linguistics.

In contrast to the monolingual Greek grammar, Latin linguistics was bilingual, covering both Latin and Greek. Many authors of an *ars grammatica* neglected Greek, however, and had no Greek examples in their texts (e.g., Donatus, Sacerdos) while others (e.g., Charisius, Diomedes, and Priscian) extensively compared their analysis with Greek and quoted Greek examples. Two authors also wrote contrastive studies. Ambrosius Theodosius Macrobius (ca.400 AD) analyzed differences and similarities between the verb in Latin and Greek, focusing on verb morphology, while Dositheus (fourth century AD) wrote a bilingual *Ars grammatica*.

3. Priscian

Priscian (ca.500 AD) represents both the culmination and the end of Roman linguistics. Writing at a time when Christianity had taken over and medieval linguistics was well on its way, he collected and systematized the results of centuries of grammatical studies in the Roman world. Born in Mauritania in North Africa and working in the largely Greek-speaking Constantinople, he was destined to become one of the most influential grammarians in history, and much of linguistics in the Middle Ages was based on his works. His main and most impressive work, the *Institutiones grammaticae* in 18 books, goes far beyond what other

Roman grammarians had aimed at or achieved. The syntactic part of his work is to a large extent inspired by and based upon the works of the leading Alexandrian grammarian Apollonius Dyscolus (see *Apollonius Dyscolus and Herodian*), the only Greek linguist who had written about syntax.

Priscian's treatment of Latin morphology, which covers most of the first 16 books (*Priscianus Major*), is one of the most thorough and well-documented morphological descriptions we have of any language, and his fascinating and complicated set of rules for word-formation within an inflectional paradigm still has important theoretical interest for morphological theory today. Priscian operates with a system of chains of rules where he starts with one basic form (e.g., nominative) and from that form derives another (e.g., genitive) which then forms the basis for the formation of the dative, and so on. But in this as in most other respects Priscian is not a theoretical innovator, since the basis of this theoretical approach to morphological analysis is well-documented in some of the sources quoted by Charisius. His two last books (*Priscianus Minor*), which treat syntax, lay the foundation for syntactic studies in the Middle Ages. No other extant work by a Roman linguist is devoted to syntax, although some of Varro's lost works (see *Varro and Early Latin Language Science*) may have focused on syntax. But we must not forget that the chapters on syntactic errors (*soloecismus*) in some of the grammars contained a multitude of observations on syntax.

Priscian is clearly 'data-oriented' in his approach. Even in morphology he constantly seeks attested examples from Latin literature for the forms (esp. rare ones) he gives in his paradigms. On the other hand, he is much more open than are many of his predecessors to taking semantic considerations into account in arguing for a certain classification or arrangement of data. Furthermore, he articulates new basic problems for linguistic research like, for instance, the reason behind the order of elements, e.g., why *a* precedes *b* in the alphabet, or why we treat the noun before the verb in our description of the parts of speech. In the syntactic part of Priscian's work the two points that may have had the strongest impact on subsequent syntactic studies are his manner of analyzing complex syntactic structures with subordination as equivalent to synonymous coordinating structures and his way of analyzing elliptical constructions by tracing them back to complete constructions.

4. The Roman *Ars Grammatica*—An Attempt at a Synopsis

Contrary to what has been generally assumed, Roman linguistics was not characterized by any lack of originality and innovation, or by stability and conformity. The Roman grammatical tradition was a very versatile and multifaceted one characterized by continuity and development (cf. Taylor 1991).

On the one hand, there is the formally oriented elementary school grammar tradition exemplified by Donatus's two grammars and by numerous similar grammars, mostly by unknown authors (e.g., the *Ars* of Cledonius (fifth century AD) and sometimes spuriously attributed to Remmius Palaemon, Probus, and Asper). This tradition is undoubtedly very uniform, and the differences between the various grammars are relatively small. With the collapse of the Roman empire there was a general decline in higher education and centers of learning in western Europe. Donatus's elementary textbooks and Christianized (largely by replacing the names of Roman gods with Christian names) versions of it become the basis for the elementary teaching of Latin in western Europe (Holtz 1981).

In a situation in which the language of the pupils was either very divergent from the norms of classical Latin or another language altogether, these books may also have been the most suitable ones available. But in the classical Roman educational system, in which the language of the pupils was quite close to the written language and where the main purpose of grammar teaching was to help the pupils to acquire a necessary background and basic metalanguage for reading poetical literary texts, grammars like those of Victorinus and Fortunatianus must have been much more instrumental. Among other things that characterize the Donatus-tradition is the lack of use of examples from literary texts, the lack of references to Greek and of Greek examples, and the lack of references to semantic criteria in the morphological classification (Hovdhaugen 1991).

Other grammars (e.g., those of Plotius, Charisius, Diomedes, and Priscian), and the commentaries on Donatus cover a number of different genres, topics, and theoretical approaches. Usually they include, besides the basic morphological part, a treatment of metrical matters, phonology (especially syllable quantity), orthography, and a comparison of Latin and Greek.

A characteristic aspect of the Roman grammatical tradition is the extensive treatment of stylistic matters, including statements concerning 'correct' and 'incorrect' Latin. Much space was devoted to establishing principles for correctness of language and to asking whether structural uniformity of paradigms, language usage, and/or the authority of the best authors should be the decisive criterion in cases of doubt.

While in the beginning the grammarians used a mixture of semantic and formal morphological criteria in their analysis and classification of Latin morphology, Donatus established a purely non-semantic approach which became dominant in the elementary *ars grammatica*. Among other grammarians, however, a more semantically oriented approach emerged, culminating in Pompeius, Phocas, and Priscian, who laid the foundation for the philosophical approach to language analysis in the Middle Ages (Hovdhaugen 1987).

Most authors have their favorite theme; for instance, the *Instituta artium* spuriously attributed to Probus concentrates on the comparison of adjectives. Another popular topic (dating back to Quintilian; see *Roman Language Science in the Early Empire*) was the analysis of the Latin case system. Not only had Latin one more case than Greek (namely, the ablative), but also the semantic and partly morphological heterogeneity of the ablative (originating from three Indo-European cases, viz., instrumental, locative, and ablative) led some grammarians (e.g., Sacerdos and Diomedes) to discuss extensively the position of the ablative and to ask whether the ablative was, in effect, one or two cases.

While the phonology (i.e., letters and their pronunciation and syllable quantity) and the morphology with its numerous paradigms and lists of examples are based in most instances on data without sources and probably to a large extent on the authors' introspection (an exception is Priscian, cf. above), stylistic and metrical matters are usually well-documented with quotations from the main Latin poets (very rarely prose writers), especially Virgil and Horace.

The most important aspect of the Roman *ars grammatica* is that it formed the grammatical metalanguage and above all the structural arrangement for elementary and advanced grammars and textbooks for language teaching in western Europe for more than 1,000 years. Even in the late twentieth century many grammars have clear echoes of Donatus.

Bibliography

Barwick K 1922 *Remmius Palaemon und die römische ars grammatica*. Dieterich, Leipzig

Holtz L 1981 *Donat et la tradition de l'enseignement grammatical: Etude sur l'Ars Donati et sa diffusion (IVᵉ–IXᵉ siècle) et édition critique*. Centre National de la Recherche Scientifique, Paris

Hovdhaugen E 1982 *Foundations of Western Linguistics: From the Beginning to the End of the First Millennium AD*. Universitetsforlaget, Oslo

Hovdhaugen E 1987 *Genera verborum quot sunt*: Observations on the Roman grammatical tradition. *Historiographia Linguistica* **13(2/3)**: 307–21

Hovdhaugen E 1991 The teaching of grammar in antiquity. In: Schmitter P (ed.) 1991: 377–91

Kaster R A 1988 *Guardians of Language: The Grammarian and Society in Late Antiquity*. University of California Press, Berkeley, California

Keil H (ed.) 1855–80 *Grammatici Latini*. 7 vols. and supplement. Teubner, Leipzig

Schmitter P (ed.) 1991 *Sprachteorien der abendländischen Antike*. Narr, Tübingen.

Taylor D J (ed.) 1988 *The History of Linguistics in the Classical Period*. Benjamins, Amsterdam

Taylor D J 1991 Roman language science. In: Schmitter P (ed.) 1991: 334–52

SECTION VI

Middle Ages — Europe

SECTION VI

Middle Ages — Europe

Early Medieval Grammar

Anneli Luhtala

This article deals with the development of language studies from about 600 to 1100, a period which is conveniently divided into two by the Carolingian Renaissance (ca.800 AD). Along with a revival of studies in general, the Carolingian Renaissance brought about a shift in the focus of grammatical studies. Literary studies, interrupted by the barbarian invasions on the Continent, were pursued without interruption in Italy while Ireland distinguished itself as a new center of study, particularly in the field of biblical exegesis. The Irish scholars exerted a continuous influence in the British Isles and later on the Continent. Grammatical studies continued to be pursued throughout the first medieval centuries, and the revival of studies that took place in the circle of Charlemagne did not mark a radical break with the grammatical studies of the preceding centuries, which were based on Late Latin pedagogical tradition. However, a number of new tendencies arose with the reintroduction of classical works into circulation and with the new association of grammatical and dialectical approaches to language. It is this which justifies discussing pre-Carolingian and post-Carolingian grammar separately.

The concerns of the grammarians of the first medieval centuries were primarily pedagogical and Donatus's (ca.350 AD) two grammars, *Ars minor* and *Ars maior*, constituted the main grammatical authority. Confronted with the new pedagogical challenge of infusing a knowledge of Latin into the christianizing Western Europe, the grammarians took to reforming the inherited grammatical works so as to conform to the new requirements of language teaching. The literacy needs of the nations recently converted to Christianity were not satisfied by any of the pedagogical grammars inherited from late antiquity, designed for native speakers of Latin. A number of elementary grammars emerged, modeled on Donatus's *Ars minor*, and supplemented with paradigms and examples. In addition, separate collections of paradigms entered into circulation. All this bears witness to the efforts of the early medieval students to gain a systematic command of Latin morphology, covered poorly in the Late Latin grammars. The challenge was a new one in the Latin tradition and the best-known response is the emergence of the 'Insular' elementary grammars.

Donatus's grammar was a teaching manual which concentrated on presenting in a concise manner what was felt to be the proper domain of the *grammaticus* (a teacher of classical literature), the analysis of the eight parts of speech. On its appearance at the end of the fourth century, its study began to be accompanied by a commentary. A commentator took to explaining Donatus's text, and asked such questions as a more advanced student would be likely to ask: Why are there eight parts of speech? Why should they be presented in the established order? Focusing on one word or phrase at a time, the commentator tries to discover the working strategies lying behind Donatus's authoritative statements. The commentator's attitude towards the text of the grammatical authority resembled that of a Bible commentator: every word was believed to be meaningful. Also, the commentators were attracted towards such approaches to language as were absent from this type of grammar. Etymological analyses continued to attract Late Latin and early medieval commentators. A new Christian work devoted to etymological explanations was composed in seventh-century Spain by Isidore of Seville (d.636 AD). In his work, *Etymologiae sive origines*, an exemplar of encyclopedic grammatical discourse in the Middle Ages, etymological analyses occupy an epistemological status as discovery procedures about reality.

The early Christians had been faced with the problem of what kind of attitude to take to the learning of classical literature, abundant with references to polytheistic gods, and to grammar accompanying the study of such literature. By the early medieval centuries, the conflict had been solved; even if the Christians did not encourage the reading of secular texts, they did not feel obliged to reject all references to such literature. The skills taught by a *grammaticus* were vitally important for a Christian, who had to gain access to the sacred writings of his religion through the medium of Latin, the language of Roman Christianity. Questions of orthography and grammatical correctness had to be mastered both by an exegete trying to establish the original text form of the Bible and by a scribe who wished to transmit the precious texts to the following generations in as uncontaminated a form as possible. St Augustine takes a moderate attitude to the study of secular literature, and in his grammar examples from pagan and Christian literature stand side by side. Christian vocabulary enters into the examples of the Donatus-based elementary grammars, and a Christian *Ars minor*, in which Donatus's grammar has been supplemented by Christian vocabulary, is believed to have been widely known.

Pre-Carolingian grammar is dominated by Donatus's two works, but various other Late Latin grammars continued to be copied. The Carolingian Renaissance introduces considerable changes in the grammatical curriculum. New classical grammars enter into circulation, some of which enjoy only a short popularity. Two works of Priscian (ca.500 AD) are reintroduced with lasting consequences: a new type of teaching method, the parsing grammar, based on Priscian's *Partitiones*, enters into the grammatical curriculum. This type of grammar, which analyzes individual word forms in question-and-answer form, is popular throughout the Middle Ages but does not replace the Donatus-based pedagogy. However, a more radical departure from the traditional linguistic issues is associated with the rediscovery of Priscian's *Institutiones grammaticae*, which had been used by very few pre-Carolingian grammarians. This work, a massive compilation of Greek and Roman grammatical heritage, touches upon more theoretical issues than any of its Late Latin predecessors and, most notably, contains a section on syntax. Moreover, Priscian's grammatical terms often have philosophical implications. Together with the study of dialectic, also revived by the Carolingians, this work inspired an inquiry into the logic of language. It is obvious that the Carolingians, who were attracted by the affinity of the two disciplines, did not see an immediate way of reconciling the two aspects of language study. However, there is evidence that the Carolingians laid the foundation for this development, which gradually led to the assimilation of the two disciplines. Carolingian grammar displays a vivid interest in a variety of linguistic issues and methods, both new and traditional, and plenty of work remains to be done to discover the details of its contribution to language study.

1. The Late Latin Inheritance

Early medieval scholars inherited from late antiquity a number of grammars which, though varying in length and coverage, were strikingly similar in content and approach. These grammars, known as *artes grammaticae*, are based upon a tradition initiated for the Romans by Remmius Palaemon (first century AD). The *artes*-type grammars deal with the eight parts of speech—or only a couple of them—listing their morphological properties, the 'accidents,' and placing a considerable emphasis on the definitions. By the end of the fourth century, the grammatical doctrine was well established, and even the order of the presentation of the parts of speech had become canonical: noun, pronoun, verb, adverb, participle, conjunction, preposition, interjection.

The study of grammar was rooted in the Roman educational system as an accompaniment to literary studies, and little originality was ever attempted by the *grammatici* who aimed at providing their pupils with an ancillary linguistic skill to aid them in their study of classical texts. In compiling their teaching material they felt free to draw on common doctrine in circulation. A list of the figures of speech, and of grammatical and stylistical errors (barbarisms, solecisms, etc.), essential for the student's later training in eloquence, would usually accompany these somewhat dry presentations of the taxonomic qualities of the Latin language. Most of the Late Latin grammars figure in the category of school-grammar (*Schulgrammatik*). A lesser-known type of grammar are the so-called *regulae*, collections of morphological paradigms, ordered alphabetically or otherwise, and completed with lists of examples. The structure and coverage of the *regulae*-type grammars—they may be restricted to the presentation of a couple of parts of speech—are such that they lend themselves less easily to pedagogical use. A third form of grammatical writing, the grammatical commentary, develops in parallel with literary commentary, which would normally accompany the study of literary texts in the schoolroom. From the end of the fourth century the *grammatici* took to applying the same method to the study of grammar.

The dominant vein in Roman linguistics, then, is to produce taxonomic accounts of the morphological properties of the Latin language for the use of the *grammaticus*. The more theoretical linguistic topics, as well as the study of syntax, did not gain ground in the Roman grammatical curriculum. There are only few traces in the surviving literature of Varro's syntactic doctrine which is assumed to have connections with Stoic logic. Varro's book on syntax contained in the last (and lost) section of his *De lingua latina* must have fallen into disuse soon after its appearance. Syntactic study was reintroduced only in the sixth century in the last two books of Priscian's massive *Institutiones grammaticae*. This remarkable piece of work, which practically fell into disuse and ran the risk of sharing the fate of Varro's syntax, had to wait for three more centuries to be truly appreciated. It was too massive and too theoretical for schoolroom use and it failed to appeal to the following generations of grammarians, whose needs were basically pedagogical. Its rediscovery in the ninth century marks a revival of interest in more theoretical linguistic issues.

2. Pre-Carolingian Grammar

Donatus's two works dominate pre-Carolingian language studies so that his *Ars minor*, containing a traditional discussion of the eight parts of speech in question-and-answer form, most often provided the model for elementary grammars. His *Ars maior*, however, dealt additionally with letters, syllables, metrical feet, and rhetorical figures, and established itself as the object of grammatical commentary at a more advanced level. Donatus had the advantage of being the teacher of St Jerome, the translator of the Bible into Latin. This was appreciated by the medieval students of grammar, who were also faced with the problem of to what extent they ought to christianize their teaching material. Also in this respect Donatus fared well because his work contained few pagan allusions.

The fates of the other Late Latin grammars during the early Middle Ages can be related to the question of to what extent these grammars serve to complete or supplement Donatus's *Ars minor* and *Ars maior*. In a situation where Donatus's grammars served to give an outline of the essential doctrine in a concise manner, it is unlikely that very short grammars of similar kind could have provided anything in terms of competition to Donatus. Such short grammars as those of Asper, Dositheus, or Scaurus seem indeed to have fallen into disuse during the first medieval centuries, and only a sporadical use of St Augustine's *Ars breviata* and the grammar of Audax can be attested. The widely used short grammar of Maximus Victorinus is an exception to this rule. By contrast, the grammars of Charisius, Diomedes, and Consentius, combining aspects of both types of grammar, contained plenty of material not present in Donatus, and enjoyed considerable popularity. Out of a variety of *regulae*-type of grammars (Eutyches, Phocas, pseudo-Augustine, and pseudo-Palaemon), Eutyches was the one to gain general popularity while the use of Phocas was restricted to a couple of authors. A couple of works could claim to be universally known by the end of the seventh century, namely Donatus's *Ars minor* and *maior* as well as one of Priscian's minor works, *Institutio de nomine*, *de pronomine*, *de verbo*, which sets out a formally based system of classification of the inflecting parts of speech. Isidore of Seville's *Etymologiae*, which presents an etymological approach to language, figures among the most widely spread works.

2.1 Insular Elementary Grammars

Little is known of early medieval developments of grammar on the Continent until the seventh century when Isidore's *Etymologiae* appeared (636). This may be because the Late Latin grammars largely satisfied the needs of language teaching in the areas where contact with the Latin language had been more direct and of a long tradition. However, a more immediate need for rearrangement in the teaching material was felt by the recently converted people in northern Europe, who had to learn Latin as a foreign language. The developments in the study of grammar during the first medieval centuries are primarily associated with the British Isles, and the teaching grammars composed in insular circles are known as 'insular' elementary grammars. From the viewpoint of a foreign student of Latin, all the classical grammars would present certain difficulties—the most obvious defect being the poor coverage of Latin morphology. In his *Ars minor* Donatus illustrates noun declension by five examples which are chosen by gender: '*hic magister*' for the masculine, '*haec musa*' for the feminine, '*hoc scamnum*' for the neuter, '*hic et haec sacerdos*' for the common of two genders and '*hic et haec et hoc felix*' for the common of three genders. His treatment of the inflection of the verb is exhausted by one example only, namely the verb *legere* (read). Donatus's students were aided by his method to recognize the structural elements of the Latin language, which of course they already commanded themselves. The noun declensions were presented more elaborately in the *regulae*-type grammars but were organized by an unhelpful principle such as alphabetical order. The approach offered by the *regulae*-type grammars was that of a reference book rather than of a systematic pedagogical work.

One solution to the problem was to compile collections of paradigms separately. Such texts, usually called *Declinationes nominum* or *Coniugationes verborum*, began to circulate from the end of the seventh century. The organizing principle in the presentation of nominal inflection in these texts was more often declension, adopted from Priscian's *Institutio de nomine et pronomine et verbo*, than Donatus's gender. Alternatively, rather than making use of separate exemplificatory material, the grammarians took to compiling new grammars with an outline based on Donatus, while paradigms and examples were drawn from recently compiled collections of inflectional patterns or from traditional sources such as Priscian's *Institutio de nomine et pronomine et verbo*. In accordance with the needs of the audience, ecclesiastical vocabulary figured prominently among the examples and paradigms.

Donatus's grammar had the advantage of containing only few pagan allusions, which made it more easily accessible to Christian readers. But it did not display any essentially Christian features either. Nevertheless, its use was not challenged by grammars which had an obvious Christian coloring, such as St Augustine's *Ars breviata*, in which examples from the

Bible, Cicero, and Virgil stand side by side. There are traces of an attempt at a christianization of Donatus's grammar but the work itself, a Christian version of *Ars minor*, has not survived. Asper (ca.600) is one of those to have made use of this grammar, which is assumed to have gained a canonical position comparable to that held by the non-Christian version. Asper drew his definition of the noun from the Christian *Ars minor*, that is, Donatus's definition completed by a list of examples from Christian vocabulary, to which Asper adds his own examples of common nouns:

> What is a noun? A part of speech which has case and signifies an object or concept, and which is either proper or common. How many properties does the noun have? Six. What are they? Kind, comparison, gender, number, composition, case. What is meant by the kind of noun? Nouns can be of two kinds: either a noun is the name of an individual and is called proper, or it is the name of many individuals, and is called common.
>
> It can be proper, like Jerusalem, Jordan, Sion or common like city, river, mountain. Proper too are Michael, Peter, Stephen, Isaiah, Aaron, Ezechiel, and common are angel, martyr, prophet, priest, king.
>
> (Law 1982)

The main concern of the insular elementary grammars is to provide presentations of the inflecting parts of speech as completely as possible, sometimes to the exclusion of the noninflecting parts. The presentation of nominal declensions is predominant, whereby the method of presenting them by declension establishes itself, for instance in the grammars of Tatwine (d. 734) and Boniface (d. 754). Verbs are discussed with less detail. The insular grammars are strikingly homogenous in content and approach. This is because they drew upon the same sources, both classical and insular, sharing an approach which permitted them to rework their sources—combining, expanding, and rewording them to their liking. This policy is made explicit by Boniface, who states that he never speaks on his own authority: 'Not a single twig of a rule will be found grafted into this little book which is not firmly rooted in one of the classical grammarians' (Law 1982). Unlike most other insular authors he based his grammar solely on classical authors. An insular elementary grammar, then, typically is 'scissors-and-paste' work with a varying degree of independence in the arrangement and wording. Tatwine modeled his grammar on Donatus's *Ars maior* using several classical and some contemporary authors. Rather than borrowing his sources word for word, Tatwine has chosen to reword his material so that his sources are beyond recognition. This approach is shared by his contemporary, Boniface. A radical reorganization in the presentation of nominal inflection has taken place in the anonymous text known as the *Ars Ambianensis*. Priscian's first declension is expanded to cover examples (masculine, feminine, neuter, and common) from the three sacred languages, Greek, Latin, and Hebrew, so that the number of examples of the first declension amounts to 14. The results of these wide-ranging experiments in describing Latin morphology entered the mainstream of elementary grammars, even though the insular grammars themselves went out of use by the middle of the ninth century.

2.2 *The Etymologiae of Isidore of Seville*

One of the grammatical works to gain a wide popularity in the early Middle Ages is the *Etymologiae* of Isidore, Bishop of Seville (ca.560–636). In this work, known also as the *Origines*, he deals with the liberal arts along with a variety of other subjects: geography, law, medicine, natural history, etc. A short account of traditional grammatical doctrine is included in this work. However, Isidore's primary concern is the etymologies of words, in which his position is based on a combination of secular and Christian sources. His word-mysticism derives features from the etymological studies of ancient philosophical schools, notably Stoicism, and the Judeo–Christian sacred onomastics, whereby names bear indications of the true essence of the thing (cf. the name of God is 'I am who I am').

Etymological studies, present as early as Plato's work, were a particular concern of the Stoic philosophers, who took them as a part of their discourse about the world. Depending on the doctrine of original name imposition, these studies provide a procedure for the recovery of truth obscured by the changed word forms. In the Roman world, such studies figure prominently in the work of Varro, who shares the Stoic approach, and in the works of Cicero, Quintilian, and St Augustine, whose attitude to etymologizing as an explanatory procedure is more skeptical. Isidore's position resembles that of the Stoics (and Varro). He establishes etymological explanations as the main epistemic channel for deriving knowledge of things: 'For unless you know the name, the understanding of things perishes.' 'When you see from where a name has originated, you grasp its essential potency more quickly. For every inquiry into a thing is clearer when its etymology is known' (Amsler 1989). Etymologizing found a particular favor with the commentators, and etymological explanations figure in grammatical texts throughout the early Middle Ages.

2.3 *Virgilius Maro Grammaticus*

The most enigmatic figure among the early medieval grammarians is undoubtedly Virgilius Maro Grammaticus. The date and provenance of his work have continued to puzzle scholars who have variously placed him in sixth-century Gaul, seventh-century

Spain, or in Ireland. The most recent studies have emphasized the insular connection of his work and the most recent dating places him in the latter half of the seventh century (Law 1982).

Virgilius's grammar is a parody of traditional grammatical doctrine. The two parts of his work, *Epitomae* and *Epistolae*, roughly correspond to Donatus's *Ars maior* and *minor* in outline. However, the doctrine has been mostly transformed beyond recognition. In addition to finding fantastic explanations to traditional grammatical concepts—such as the comparison of letters with the human being in its growth—Virgilius invents new linguistic topics. Such is his theory of the 12 latinities, introduced in his discussion of wisdom (*sapientia*) which replaces Donatus's discussion of *vox*. Only one of the twelve types of Latin, he says, is in current use. In one of his *epitoma* he experiments with etymologies. In the *Epistolae* he tells of fantastic disputes between the grammarians on trivial questions: Terrentius and Galbungus, for example, are said to have passed 14 days and nights arguing over the vocative of the personal pronoun *ego* (the first person singular). Fictitious authorities such as Aeneas and Virgilius Assianus have replaced the traditional Donatus and Priscian, who figure prominently among Virgilius's sources. Interestingly, Virgilius made use of Priscian's little known *Institutiones grammaticae* along with a number of more widely known grammars. In spite of its unusual doctrine, Virgilius' work was used, for instance, by the Anglo-Saxon scholars Bede and Boniface, and it continued to attract attention in the ninth century.

2.4 Exegetical Grammar

In the pre-Carolingian period, the more advanced study of language took the form of a commentary on one of Donatus's grammars, analogous to that applied to the Bible by contemporary Irish exegetes. This method had a precedent in the Late Latin commentaries on Donatus and, ultimately, in commentaries on literary works. The *grammatici* were accustomed to subjecting the set texts to careful scrutiny, explanation and commentary, and to elucidating mythological, geographical, and stylistical questions related to the text, and they transferred this method to the very tool of their work, the grammar itself. This genre, initiated on the appearance of Donatus's grammar by Servius, who also wrote a commentary on Virgil, found an immediate continuation in the commentaries of Servius, Cledonius, Pompeius and pseudo-Cassiodorus. The commentaries of Pompeius and Servius enjoyed wide popularity in the seventh and eighth centuries. Out of an unknown number of exegetical grammars the following have survived from the pre-Carolingian period: a commentary from seventh-century Spain by Julian of Toledo, by an anonymous Irishman in seventh- or eighth-century Bobbio (the *Ars Ambrosiana*) and by other anonymous Irishmen in the seventh and eighth centuries. Commentaries continued to be written throughout the Middle Ages, being more often focused on Priscian's *Institutiones grammaticae* in the High Middle Ages.

Donatus's works are teaching manuals concentrating on the presentation of the essential characteristics of the parts of speech. While presenting his doctrine in an authoritative style, Donatus does not explain his strategies. The commentator, who taught by means of explaining and elaborating on his text, takes his compact text as a point of departure for an exegesis analogous to that required by one of the set texts. Donatus introduces the parts of speech very briefly:

> There are eight parts of speech, noun, pronoun, verb, adverb, participle, conjunction, preposition, interjection. Two of them are principal parts of speech, the noun and the verb. The Latin (grammarians) do not include the article in the number of the parts of speech, whereas the Greeks do not include the interjection. Many (grammarians) think that there are more than eight parts of speech, many think that there are less than eight of them.
> (Amsler 1989)

The commentator inquires into the reasons for such statements: why should the number of the parts of speech be eight? why should they be presented in the established order? why should the noun and the verb be called the principal parts of speech? By focusing on each word or phrase in his text and by asking questions continuously, a commentator makes Donatus's working method more explicit and introduces such aspects as are absent from this type of grammar. Among the favorite topics which continue to attract attention is the *raison d'être* of each part, which in the pre-Carolingian period is traditionally answered:

> The noun correctly occupies the first place among the parts of speech, because the knowledge of all things originates in the noun. After the noun must come the pronoun, because it fulfills the function of the noun and cannot be divorced from its meaning. Thereafter comes the verb, because we say that we use it most frequently.
> (Amsler 1989)

Etymological interventions are among their favorite concerns. Starting with such terms as *ars* and *grammatica* the commentator illuminates the nature of grammatical concepts by way of etymological analyses:

> '*Ars*' is so called from *tes aretes*, that is, from virtue, which the Greeks call the knowledge of each and every thing; or truly it is named *ars* because it encompasses everything with precise, that is short and brief principles.
> (Amsler 1989)

This method permits the commentator to refer to points of controversy among the grammarians. Even if the commentator generally wanted to maintain the doctrine of the authority, critical remarks are occasionally addressed to Donatus himself.

An interesting case for a commentary is provided by the definitions. Donatus presents his technical definitions without making his method explicit. Following Servius's example, the commentators take to analyzing these definitions with the intention of discovering the defining strategy: a definition should both distinguish a part of speech from other parts and specify the unique property of the part in question. Analyzing Donatus's definitions along these lines remains a regular preoccupation of the commentators. For instance, Donatus's definition of the noun began to be exemplified by a standard example, namely by analyzing the philosopher's definition of man: *homo est animal rational mortale risus capax* (Man is a rational and mortal animal who is capable of laughter). Inspired by Isidore of Seville, Julian of Toledo adds a Christian coloring to his version of this discussion. When he says 'animal,' Julian states, he is referring to a property common to all living creatures as distinct from trees; when he says 'rational' he is referring to a property which distinguishes human beings from beasts and associates them with the angels; when he says 'mortal,' he distinguishes human beings from the angels and associates them with beasts; when he says 'capable of laughter,' he is distinguishing human beings from the angels and beasts and indicates a property unique to man.

Among the features borrowed from contemporary Irish biblical exegesis are the questions as to the *locus*, *tempus*, and *persona* of the author (and sometimes the *causa scribendi*), by which the commentaries are introduced. Also, references to the three sacred languages, namely Latin, Greek, and Hebrew—sacred because of the writings on the cross—can be attributed to the influence of the Irish exegetes.

3. Carolingian Renaissance

The revival of Classical learning, which has earned this period its conventional label, began at the royal court itself. In order to improve the basic education of the clergy and people, Charlemagne had gathered a number of literate clerics into his circle. In the new spirit of learning, language reforms were carried out in order to acquire a more classical style, and a new more legible script was introduced, the Carolingian minuscule, which greatly facilitated international written communication. Various scholarly activities were pursued with significant consequences. The study of philosophy and rhetoric was revived, and the work of textual critics resulted in a revised text of the Bible. The achievements of the scholars originating from this circle, many of whom were foreigners (Petrus of Pisa and Paulus Diaconus from Italy, Theodulf of Orleans from Spain, Alcuin from Northumbria), began to rival those of late Antiquity.

The most central figure associated with this movement was Alcuin of York, Abbot of Tours from 796–804. In his prologue to the study of the liberal arts, inspired by Boethius's *De Consolatione*, Alcuin presents a synthesis of secular and Christian views of education. He exalts the study of philosophy, associating it with the Christians' search for wisdom. A biblical allusion to wisdom—'Wisdom hath builded her house, she hath hewn out her seven pillars'—is reinterpreted so that the seven pillars refer both to the gifts of the Holy Spirit and to the seven liberal arts. Alcuin goes as far as identifying Charlemagne as a new Solomon and encourages the study of Classical literature. Smaragdus, Alcuin's contemporary, was concerned with combining the sweetness of the Scriptures with the utility of the study of grammar. In his typically Christian grammar, he attacks those who want to find an excuse for not studying grammar in the fact that the grammar does not mention God. Just as the Jews took back from Egypt gold and silver offering them in the service of God, he says, the Christians should make use of an originally pagan art of grammar to a Christian end. Smaragdus's grammar, a commentary on Donatus, contains an unusually large number of examples from the Scriptures suggesting that he has made a systematic grammatical study covering the Old and the New Testament. Also, he is fond of finding religious explanations for points of grammatical doctrine. The confrontation between Classical and Christian learning would seem to be abolished. Later in the ninth century aspects of theology and grammar continued to attract, for instance, Godescalc who dealt with grammatical questions but never wrote a grammar. However, the question of Christian grammar falls outside the mainstream of Carolingian language studies.

The new literary and intellectual interests of the Carolingian Renaissance are reflected in changes in the grammatical curriculum. A variety of grammatical activities is associated with the circle of Alcuin and with the immediately following generations of scholars. The two grammarians invited by Charlemagne from Northern Italy, Petrus of Pisa, and Paulus Diaconus, both wrote an elementary grammar in the insular tradition. Alcuin himself wrote an elementary grammar in the form of dialog between a teacher (Alcuin) and two pupils (Saxo and Franco), which is based on apparently traditional schoolroom doctrine. However, it is different on two important points at least: first, it draws upon the doctrine from Priscian's *Institutiones* and second, Alcuin introduces the dialecticians' definitions of the parts of speech along with the grammarians'. Alcuin's own grammar is not a radical departure from the traditional approach: the grammar continues to pertain, according to its definition, as *custos recte loquendi et scribendi*, to a practical, elementary level. Nevertheless, his other contributions to language study suggest that he was encouraging new tendencies. He brought into circulation the most challenging of all classical grammars, Priscian's *Institutiones grammaticae* (see Sect: 3.3) and produced an excerpted version of its two final books on syntax.

3.1 Grammar and Dialectic

Along with a renewed grammatical curriculum, Alcuin reintroduced the study of the two other *artes sermonicales*, dialectic and rhetoric, which had been nearly unknown to the preceding centuries. New dialectical works enter circulation: Boethius's translations of Porphyry's *Isagoge* and Aristotle's *De interpretatione*, Boethius's commentary on them, and the paraphrase of Aristotle's categories known as *Categoriae decem*, which came to be the most intently studied logical work in the ninth and tenth centuries. In the circle of the *Scotti peregrini*, Johannes Scottus made significant achievements in the field of dialectic while grammatical activities were pursued at least by Sedulius Scottus, Murethach and the anonymous author of the *Ars Laureshamensis*, the *Ars Brugensis*, and *Donatus Ortigraphus*. Sedulius wrote several exegetical grammatical works, e.g., a commentary on Donatus's *Ars minor* and *Ars maior* and a commentary on the *Priscian maior*.

The question has been recently asked to what extent the revived interest in dialectic led the Carolingians to compare logic with grammar, given that Priscian's *Institutiones* also stimulated an inquiry into the logic of language. The grammatical terminology employed by Priscian bears a resemblance to philosophical terms, (e.g., *substantia*, *accidens*, *proprietas*) and such concepts have a significant bearing on his syntactic theory. Alcuin's role in relating dialectical and grammatical concepts to each other remains ambiguous. He wrote a manual on dialectic as well as an elementary grammar, in which he juxtaposes the grammarian's and the logician's definitions of the noun and the verb (the two parts of speech recognized by the dialectician). However, he makes no attempt to assimilate them. Whatever Alcuin's view of the relationship between dialectic and grammar was, it is obvious that the following generations of grammarians became increasingly aware of the affinities between the two disciplines. An area where an immediate interplay between them is discernible, is the definitions. The grammarians are attracted to analyzing grammatical definitions in accordance with the types posited by the dialecticians, whose proper task the formulation of definitions was understood to be. A list of the various types of definitions was available to them in the works of Marius Victorinus, Cassiodore, and Isidore of Seville. The practice of applying the dialectician's method to grammatical definitions is customary in the circle of the *Scotti peregrini*, initiated perhaps in a lost work from the beginning of the ninth century. Sedulius Scottus analyzes the various ways of defining the noun in the following manner:

> The types of definition according to the grammarians are six in number. The first is definition according to the substance, e.g., a noun is a part of speech with case. The second is definition according to the sound, e.g., the noun is as it were, a note. The third is according to its specific properties, e.g., signifying an object or concept and either proper or common. The fourth is in terms of its accidents, e.g., the noun has six accidents. The fifth is quantitative, e.g., there are eight parts of speech. The sixth is according to the etymology, e.g., *homo* is so called from *humus*, and *humus* from *humor*.
>
> (transl. Law)

Variations of this method are attested in various works; some grammarians employed three types, some five, and so forth.

The next source of inspiration for the application of dialectical concepts to grammar was provided by Aristotle's ten categories. Later in the ninth century and during the tenth, attempts can be found to analyze words according to the ten Aristotelian categories, and to apply dialectical tools such as subject-predicate distinction to syntactical analysis (Piper, *Die Schriften Notkers und seiner Schule*). The details of the gradual assimilation of the concerns of dialectic into the study of grammar have yet to be investigated.

3.2 Elementary Grammar

Most of the insular elementary grammars and *declinationes nominum* tracts have come down to us in Continental manuscripts dating from the end of the eighth and first half of the ninth centuries. That this teaching method was still found satisfactory at this time is supported by the fact that new works were composed in this genre. The grammars composed by the two Italian teachers at Charlemagne's court, Paulus Diaconus and Petrus of Pisa, as well as the grammar attributed to Clemens Scottus belong to this genre. By the mid-ninth century, the insular approach no longer found favor in the Frankish and German centers but continued to be practiced in Spain in the ninth and tenth centuries. The Carolingians, in accordance with the spirit of the time, preferred to turn to new Classical sources or, in the case of Donatus, to the uncontaminated version of his work. Grammars nearly unknown to the preceding generations were reintroduced, such as the grammars of Asper, Dositheus, Scaurus, and the *Ars breviata* of St Augustine, but their use was of less importance. Along with Donatus's grammar, which was now studied supplemented with some examples and paradigms, a new pedagogical technique was introduced, the use of parsing grammars. This approach, which identifies and analyzes individual word forms in question-and-answer form, became very popular as a teaching method, and texts of varying length and content began to appear at the beginning of the ninth century.

The model for parsing grammars was provided by Priscian's *Partitiones*—a work unknown to the pre-Carolingian grammarians—the first manuscripts of which derive from northern France. In his work Priscian analyzes each word in the first lines of every book of the *Aeneid* in question-and-answer form.

> For instance, *Regina* 'queen' is what part of speech? A noun. What is a noun? A part of speech, etc. How many properties does a noun have? Six: quality (proper common), derivational status, gender, number, simple compound status, case. What is its derivational status? Derived. Tell me its base. From *Rex* 'king.' Where does *rex* come from? From the verb *rego* 'I rule.'
>
> (Law 1992)

Two of the best-known elementary texts of the later Middle Ages are *Dominus quae pars* and *Ianua*, the former of which has been falsely attributed to Remigius of Auxerre. This type of grammar maintained its popularity until the end of the Middle Ages. Along with the works of Priscian, grammars of the *regulae* type now received greater attention. Priscian's *Institutio de nomine* and the grammars of Eutyches and Phocas were the focus of commentaries by Remigius of Auxerre, Sedulius Scottus, and various anonymi.

3.3. Rediscovery of Priscian's Institutiones Grammaticae

Before its rediscovery in the Carolingian Renaissance, Priscian's *Institutiones* was known in Italy and Northumbria, and probably in Ireland, but no manuscripts of this work survive from the first medieval centuries. It was used by only a few grammarians (e.g., Virgilius Maro Grammaticus and Aldhelm) but its use did not make any substantial contribution to the study of grammar. The first manuscripts extant derive from the end of the eighth century, and about 60 manuscripts have come down to us from the ninth and tenth centuries. As to the provenance of the Carolingian manuscripts, the French *scriptoria* predominate (some of the earliest ones come from Tours) whereas from the eleventh century on, the great wealth of Priscian manuscripts (ca.280 from the eleventh to twelfth centuries) derive from various centers in France, England, Germany, and Italy, bearing witness to the increasing popularity of this work as an object of study.

Priscian's *Institutiones* is a massive compilation in 18 books which often circulated in two parts in the Middle Ages. The first 16 books, known as *Priscian maior*, consist of a detailed discussion of the conventional topics—the parts of speech, as well as the preliminary topics, letter, syllable, and so forth. The last two books, the *Priscian minor*, present a discussion on syntax. Priscian makes use of traditional Latin sources but also shows a great admiration for the Greek grammarians, notably for Apollonius Dyscolus, whose treatise on syntax provided the model for his syntactic discussion. The more familiar doctrine of the first 16 books became the object of study first, whereas the *Priscian minor* was slower in gaining popularity. However, it must be noted that Alcuin's excerpted version of Priscian's work drew mainly upon the *Priscian minor*, which suggests that the Carolingians were not uninterested in syntactic questions. Neither could they avoid encountering terms with syntactic implications in their study of the *Priscian maior*. The Carolingians' concern for syntactical issues is attested by the heavily glossed Priscian manuscripts in which points of syntactical doctrine are elaborated as well as by the emergence of two treatises devoted to word order. It was the *Priscian minor* which provided the framework for the lively discussion on syntax in the later Middle Ages and a commentary on this work became the standard working method.

Priscian's massive work was subjected to active commentary, excerpting and explanation in accordance with the practices adopted during the preceding centuries. The number of excerpted versions of this book bears witness to the efforts of the Carolingian grammarians to make the doctrine of this huge work more accessible. Such are, along with Alcuin's abbreviated version, the *Adbreviatio* of Ursus of Beneventum and the *Excerptiones de Prisciano*. This latter was used by Ælfric as the basis of his Latin grammar of Old English. Walahfrid Strabo produced works which combined material from *Institutiones* together with the doctrine of Donatus's *Ars minor* and *Ars maior*. The *Scotti peregrini* made regular use of the *Institutiones* in their works, and one of Sedulius Scottus's commentaries was focused on *Priscian maior*.

Although Priscian's doctrine of the parts of speech does not radically differ from the traditional doctrine—he makes heavy use of Donatus's grammars—his work contains a wealth of details absent from the other works. Also, his approach differs in that he touches upon more theoretical issues than his predecessors and, as has been noted, his terms and concepts often have philosophical implications. Priscian's work contains aspects so far dealt with by the commentators only, and at such points his doctrine tends to be more sophisticated than that of the Donatus-commentators. Regarding the *raison d'être* and the order of the parts of speech Priscian, unlike Donatus, presents the verb immediately after the noun rather than after the pronoun. The justification is at once philosophical and syntactical. Relating the principal parts of speech to a minimal clause, Priscian claims that the noun must be placed first because name-giving takes place with respect to nouns and the property of the verb, action and undergoing of action, depends on the prior existence of the noun as an expression of substance. It is these kinds of issues that stimulated the commentators, who liked to dwell on points of controversy and had now got a body of new doctrine available.

The fragmentary commentary of Sedulius Scottus has so far been the only commentary on Priscian's principal work known from the Carolingian period. Recently, a full commentary on *Priscian maior* from the ninth century has been discovered, with a tentative attribution to Johannes Scottus Eriugena. The edition of this commentary will throw new light on the philosophical orientation of linguistic discussion in the ninth century. Apart from commentaries which can be attributed to identified persons, the exegetical work was often carried out anonymously and appears in the margins of the Priscian manuscripts. The doctrine of such glosses represents accumulating contemporary knowledge, and presents great problems of dating. From the eleventh century onwards commentaries based on such glosses are found written out continuously. Such are the commentaries known as the *Glosulae*-tradition whose earliest version has been dated in the latter half of the eleventh century. The form of such commentaries bears witness to the manner of their birth: they tend to be extremely repetitive and disorganized. They do not claim the status of an independent work but are rather meant to be read along with Priscian's *Institutiones*. It has recently been discovered that the central figures of the twelfth-century Renaissance William of Conches (ca.1125) and Peter Helias (ca.1140) depended very much on the tradition of the gloss commentaries. They also cast their grammatical writing in the form of commentaries on Priscian; however, these are much better organized than the *Glosulae*-commentaries. In the twelfth century emerged also independent treatises on syntax which can be attributed to identified persons (e.g., Robert of Paris and the Englishman Robert Blund).

Bibliography

1. Primary Sources

Alcuin *Dialogus Franconis et Saxonis de octo partibus orationis. Patrologia latina* CI: 849–902

Asporius (Asper) *Ars Asporii. Grammatici latini* VIII: 39–61

Boniface 1980 *Ars grammatica.* Brepols, Turnhout (Ed. by Gebauer G J, Löfstedt B)

Corpus christianorum continuatio medievalis. Brepols, Turnhout

Corpus christianorum series latina. Brepols, Turnhout

Donatus *Ars minor* and *Ars maior. Grammatici latini* IV: 355–402

Grammatici latini. Keil H (ed.) 1855–80 8 vols. Teubner, Leipzig. Repr.1961Olms, Hildesheim

Isidore of Seville 1911 *Etymologiae: Isidori Hispalensis episcopi Etymologiarum sive originum libri* XX. Lindsay W M (ed.), 2 vols. Clarendon Press, Oxford

Julian of Toledo 1973 *Ars Iuliani Toletani episcopi: Una gramatica latina de la España visigoda.* Publicaciones del Instituto provincial de investigaciones y estudios toledanos, Toledo (Ed. by Maestre Yenes M A H)

Patrologia latina. Patrologiae (latinae) cursus completus 1844–64, 221 vols. J-P Migne, Paris

Piper P (ed.) 1882 *Die Schriften Notkers und seiner Schule.* Mohr, Freiburg im Breisgau & Tübingen

Priscian *Institutiones grammaticae. Grammatici latini* II: 1–597; III: 1–377

Remigius 1902 *In Artem Donati minorem commentum.* Teubner, Leipzig (Ed. by Fox W)

Remigius *In Artem maiorem Donati commentarium. Grammatici latini* VIII: 219–74

Sedulius Scottus 1975 *Commentum in Maiorem Donatum Grammaticum.* Pontifical Institute of Medieval Studies, Toronto (Ed. by Brearley D)

Sedulius Scottus *Sedulius Scottus in Donati Artem minorem, In Priscianum, In Eutychem.* Grammatici hibernici carolini aevi. Pars III: 2. Corpus christianorum continuatio medievalis XL C (Ed. by Löfstedt B)

Smaragdus 1986 *Liber in partibus Donati.* Corpus christianorum continuatio medievalis LXVIII. (Ed. by Löfstedt B, Holtz L, Kibre A)

Tatwine *Ars.* (Ed. by De Marco M) In: *Tatuini Opera omnia.* (Ed. by De Marco M, Glorie F) 2 vols. I: 1–93. Corpus christianorum series latina CXXXIII

Virgilius Maro Grammaticus 1979 *Epitomae* and *Epistolae.* Polara G (ed.) *Virgilio Marone Grammatico: Epitomi ed Epistole.* Liguori, Naples

2. Secondary Sources

Amsler M 1989 *Etymology and Grammatical Discourse in Late Antiquity and the Early Middle Ages.* Benjamins, Amsterdam

Holtz L 1981 *Donat et la tradition de l'enseignement grammatical: Etude sur l'Ars Donati et sa diffusion (IV^e^–IX^e^ siecle) et édition critique.* Centre national de la recherche scientifique, Paris

Law V 1982 *The Insular Latin Grammarians.* Boydell Press, Woodbridge

Law V 1986 Late Latin grammars in the early Middle Ages: a typological history. In: *Historiographia Linguistica* **13**: 365–80

Law V 1985 Linguistics in the earlier Middle Ages: the Insular and Carolingian grammarians. *Transactions of the Philological Society* 1985: 171–93

Law V 1991 Carolingian grammarians and theoretical innovation. In: Ahlqvist A et al. (eds.) *Papers from the Fifth International Conference on the History of Linguistics.* Benjamins, Amsterdam

Law V (ed.) 1993 *History of Linguistic Thought in the Early Middle Ages.* Studies in the History of the Language Sciences, 71. Benjamins, Amsterdam

Law V 1994 The study of grammar. In: McKitterick R (ed.) *Carolingian Culture: Emulation and Innovation*: 88–110. Cambridge University Press, Cambridge

Luhtala A 1993 Considerations on word order in the early Middle Ages. In: *Beiträge zur Geschichte der Sprachwissenschaft* **3**: 209–240

Marenbon J 1983 *Early Medieval Philosophy (480–1150): An Introduction.* Routledge & Kegan Paul, London

Linguistics in the Later Middle Ages

Geoffrey L. Bursill-Hall

The period 1150–1400 is regarded as one of the golden periods in the history of linguistics, a period when the study of language increased considerably, as a result not only of the general increase in learning and literacy, but of the incorporation of the Aristotelian Organon into the university syllabus, especially in the northern schools. As the first subject of the Seven Liberal Arts, grammar enjoyed a privileged position and developed along with logic into the creation for the first time of a linguistic theory which sought to explain the formation and meaning of words and the structure and meanings of sentences. The Schoolmen saw this as necessary if they were to have on hand an instrument sufficiently well honed to enable them to talk about their world, their universe, and God with any degree of success.

1. Grammar in the Later Middle Ages

The term *grammatica* was used in the Middle Ages in different ways and one encounters at least *three* distinct uses of the term: (a) it was used to represent what we would today call *normative* grammar divided into the teaching of elementary Latin to beginners and the teaching of more advanced Latin; (b) *literary* grammar, what Pinborg (1967: 58) has called *grammatica (im)positiva*; and (c) *grammatica speculativa*, the study of grammatical theory which the Schoolmen considered a science, and what we would today call linguistics. I shall return to this matter towards the end of the article. There is an additional aspect which was the training of masters for the newly formed grammar schools; this led to the creation at Oxford and Cambridge of the Master of Grammar degree. Grammar, particularly during the high Middle Ages, enjoyed different applications in the Northern schools from those in the Southern schools. In the former, especially during the twelfth and thirteenth centuries, *grammatica* was closely associated with *logica*, whereas in the latter, above all in Italy, *grammatica* was more closely associated with the *Ars dictaminis*, or *rhetorica*, the study of 'belles-lettres.' These distinctions have often been misunderstood and overlooked. The closer interrelationship between *grammatica* and *logica* is a later development, the result of the incorporation of the Aristotelian Organon (Prior and Posterior Analytics); the earlier Middle Ages had been more concerned with the preservation of the Greco–Latin tradition and with the development of literacy in Latin. It was from such a base that later developments in theoretical and pedagogical practice were to develop and this aspect of their work should not be ignored or neglected. It is quite clear that scholars of the Middle Ages had always practical matters in mind and indeed there was throughout an unbroken tradition of Latin pedagogy.

2. Premodistic Grammar

Grammar was taught in the medieval university in the form of commentaries on the work of the Late Latin grammarians, Donatus and Priscian; such is the conventional statement. The requirements of the Universities of Paris and Oxford, according to statutes dating from 1252, stipulated the required reading of Priscian (but not Donatus). The change in attitude to grammar or, to be more precise, the division of grammar into pedagogical and speculative started in the early twelfth century; it was the study of Priscian only that provided the basis for the new scientific grammar. Grammars based on Donatus however were prolific and 'humanist' grammars (what might be called *grammatica practica*) were written throughout this period, but grammars of the scientific kind were based on Priscian (according to the Aristotelian definition of science) and derived from the 'ordinarie' reading under the guidance of a master. A large number of these are still extant.

Attempts were made to replace Priscian as the required text but these do not appear to have succeeded to any great extent, or at least not until the late fourteenth century. The Statutes of Oxford dated 1431 still called for the reading of Priscian but this seems to have been 'more honour'd in the breach than in the observance.' Two works in particular, i.e., the *Doctrinale* (1199) of Alexander de Villa-Dei and the *Graecismus* of Eberhardus Bethuniensis (fl.1212) along with the works of John of Garland (fl.1235) were very popular—many copies of these have survived. Nevertheless, commentaries on Priscian (sometimes described as Doctrinale commentary or *Quaestiones*/ or *Tractatus*/ or *Summa de grammatica*) formed the basis of medieval speculative grammar. There are over 200 such commentaries still extant; few have been edited.

The changes in direction that characterize the scientific study of grammar in the twelfth and thirteenth centuries appear to have started with the teaching of William of Conches (ca.1080–ca.1154) who taught at Chartres, and of his pupil Petrus Helias who taught in Paris ca.1140, though it is probable that the movement actually started in the late eleventh century; details are to be found in marginal commentaries of Priscian of the time, written in what has been described as *écriture microscopique* 'microscopic hand.' William's Priscian commentary has not yet been edited, but it can be said that his importance rests on two facts: his criticism of the adequacy of Priscian's criteria and his invention of the *causae inventionis* 'theoretical bases,' and the teaching of his pupil Petrus Helias in mid-twelfth century. The implications of this were enormous, i.e., it led to the establishment of grammar as an autonomous discipline along with the incorporation and refinement of older definitions, the fusion of grammatical and logical terminology, and subsequently, the introduction and refinement of the idea of universal grammar and the extension of the *modus significandi* 'mode of signifying.'

The thirteenth century can be conveniently divided into two parts, premodistic and modistic (see Sect. 3). This was the period of the Schoolmen par excellence, of some of the greatest logicians, philosophers, and theologians, e.g., Petrus Hispanus (d.1277), Lambert of Auxerre (fl.1250), William of Sherwood (fl. ca. 1250), Albertus Magnus (ca.1200–80), Duns Scotus (ca.1265–1308), St Bonaventure (ca.1217–74), and Thomas Aquinas (ca.1225–94). It was at this time that Aristotelian philosophy was fully absorbed into Western thought, the period when logic and grammar became most closely associated. The names of three grammarians stand out—Jordan of Saxony, Robert Kilwardby, and Roger Bacon.

Jordan (fl. ca.1210), the earliest of the three, wrote a commentary on the Priscian Minor in which he proposed the idea of universal grammar, which was necessary if grammar was to be recognized as a science. The implications of this suggest a shift of emphasis away from surface features; he also taught that grammar should be more concerned with meaning which is common to all men.

Two Englishmen, Robert Kilwardby (d.1279) and Roger Bacon (ca.1214-ca.1294), both of whom taught in Paris, were scholars of great originality, but their position in terms of developments in the thirteenth century cannot yet be defined with any accuracy. This is not intended to diminish their importance. Bacon has long been famous for his proposition regarding universal grammar, i.e., 'Grammatica una et eadem est secundum substantiam in omnibus linguis licet accidentaliter varietur' (grammar is substantially one and the same in all languages, although it may vary accidentally), but there is clearly much more to his views on language than that; his was a more practical approach to the study of language and languages without diminishing the scientific approach that he advocated in all his work. Robert Kilwardby was one of the leading English thinkers of the thirteenth century and the leading English Dominican of the period; he wrote extensively on logic, theology, and grammar. His work can be divided into two parts, i.e., his logical and grammatical treatises written while teaching as a Master at Paris and his theological work after his entry into the Dominican Order. In the present context, he wrote an extensive commentary on the Priscian Minor, a commentary on the *Barbarismus* of Donatus, a commentary on the *De Accentu* of the pseudo-Priscian; a collection of grammatical sophismata has been ascribed to him and he also wrote a collection of *Errores condemnati* and a very important *De Ortu Scientiarum*. A commentary on the Priscian Major has been ascribed to him but there is a general consensus that this is an erroneous ascription. Kilwardby was a grammarian of great distinction and importance, but his Priscian Minor commentary is not an account of Latin sentence composition but rather an account of what might be called sentential semantics. If one compares the statement of Petrus Helias on the nature of grammar, i.e., 'grammatica est scientia gnara recte scribendi et recte loquendi' (grammar is the learned science of writing and speaking correctly) and Kilwardby's 'sermo significativus prout abstrahitur ab omni lingua speciali' (significant speech inasmuch as it is abstracted from every individual language), likening grammar to geometry, i.e., irrespective of the superficial differences between languages or the shapes and sizes of different diagrams, one can get some idea of the progress that had been made in grammatical theory in the 100 years that separated Peter from Kilwardby.

Until quite recently there was a gap in knowledge of developments in grammatical thought for a period of about a hundred years, i.e., 1150–1250. Apart from a few names, little more was known: Ralph of Beauvais (fl. ca.1170) was well known as a grammarian but Petrus Hispanus (non-Papa) (fl. ca.1175), for instance, author of the treatise *Absoluta*, was little more than a name—indeed, there was much confusion since both Peter Helias and Petrus Hispanus are often referred to in contemporary grammatical manuscripts as P. H.

Such statements are now invalid and more recent work, especially by a small number of younger scholars, has shown that medieval grammarians of the later twelfth and early thirteenth centuries were fully representative of the richness of the intellectual achievements of this period of medieval scholasticism. For example, K. M. Fredburg (Copenhagen) has clarified the status of William of Conches and Peter Helias; C. H. Kneepkens (Groningen) has produced texts of late twelfth-century grammarians, e.g., Ralph of Beauvais, Petrus Hispanus, Robert of Paris (fl. ca. 1175), Robert Blund (fl. ca.1180), as well as a collection of Quaestiones grammaticales from an Oxford (Corpus Christi College 250) manuscript, and a series of studies on various termini technici; M. Sirridge (Louisiana) has edited Jordan of Saxony's Priscian Minor commentary and produced studies on Robert Kilwardby (Rosier 1990b); and Irène Rosier (Paris) has written extensively on Roger Bacon, Robert Kilwardby, speculative grammar, and other aspects of medieval grammatical thought (Rosier 1990b).

All the works mentioned in the previous paragraphs are in fact treatises on syntax, and when the Kilwardby Minor and the works of Michel de Marbais (including his commentary on Priscian Minor recently come to light) become available, it will be much easier to justify the claim that the study of syntax made great advances in the Middle Ages; it is certainly quite wrong, as Covington (1984: 126) points out, to ascribe all this progress to the Modistae.

Medieval grammarians introduced and refined certain *termini technici*. It is well known that the idea of *regimen* (rection) was a medieval development, but so also was the refinement of terms and concepts such as *absolutio* (absolute, Kneepkens in Rosier 1988: 155 69), *compositio* (composition, Kelly in Bursill-Hall et al. 1990: 147–59), *constructio* and *transitio* (Kneepkens in Bursill-Hall et al. 1990: 161–89), *dependentia* (dependency, Covington 1984), *congruitas* (congruity, Kneepkens, cf. biography of Roger Bacon), and *relatio* (relative, cf. Rosier 1990b). Some of these terms can be traced back to Priscian, e.g., *absolutio*, and to Greek linguistic scholarship, e.g., *transitio*, but they did not acquire the precision necessary for a technical term until used by the later medieval grammarians. Some seem to have been medieval creations, viz. *compositio*; Thomas of Erfurt established 'composition' as an accidental mode of the verb to express the relations between the verb and its *suppositum* (subject) in contrast to 'signification' which expressed relations between the verb and postposed nominal (cf. Kelly in Bursill-Hall et al. 1990: 147–59). The Modistae in particular originated the idea of the separate techniques of *Prohemium* (metalanguage), *Etymologia* (word classes), and *Diasynthetica* (syntax); these must be regarded as separate techniques but with the necessary 'mixing' to produce a coordinated statement and without a separate semantic technique.

3. The Modistae

By 1270 there had emerged a new framework used to account for the facts of language and to create a grammatical statement which embodied the philosophy and logic of language which Scholastic philosophers had been developing. This literature was stated in the form of treatises on the *modi significandi* 'modes of signifying' and the authors came to be known as Modistae. This somewhat amorphous group of grammarians dominated the grammatical scene for the next 50 years.

Viewed in terms of the grammatical literature written between 1100 and 1450 and which has survived, modistic grammars represent a rather small proportion of the material available, but their importance is beyond dispute. The names of about 30 authors are known; there are about 100 treatises which are either modistic commentaries or anonymous treatises labeled 'Modus significandi' as well as many others, modistic in tenor, labeled indiscriminately Priscian/Donatus/Doctrinale commentaries. There are seven grammarians who stand out above the others, i.e., Boethius of Dacia (fl. ca.1270); Martin of Dacia (fl. ca.1270); Michel de Marbais (fl. ca.1280); Albertus (fl. ca.1285); Siger de Courtrai (fl. ca.1300); Radulphus Brito (fl. ca.1300); and Thomas of Erfurt (fl. ca.1310). They separate into three convenient groups; Boethius (who was especially severe in his criticism of the adequacy of Priscian's theoretical base) and Martin were the initiators and gave the theoretical thrust to the whole program; Michel, Albertus, and Siger are the middle group serving to consolidate the proposals of their predecessors (Siger seems to have been most conscious of the pedagogical problems involved with this type of grammatical literature); Radulphus and Thomas represent the completion of the program, with Radulphus providing the theoretical basis for their approach to syntax and Thomas a manual which sets out in an orderly fashion the rudiments of a complete modistic grammar. The result is a full picture of the development of a grammatical theory, especially the refinement of descriptive criteria used to establish the word classes and sentences of Latin, which was for the Modistae a more 'perfect' language than any of the vernaculars. That this was so requires no further comment. If manuscript distribution is any guide, these grammars are to be found in libraries all over Europe which suggests that modistic grammar was quite widespread. Most Modistae had some connection with the University of Paris; Thomas of Erfurt studied in Paris but returned to Erfurt which seems to have been an important center for grammatical studies in the fourteenth century (cf. Pinborg 1967: 139–51). Indeed, some of the earliest and strongest attacks on modistic theory came from Erfurt masters, in particular Johannes Aurifaber (fl. ca.1330).

Thomas of Erfurt's *Grammatica Speculativa* 'Speculative Grammar' will be used for this account of modistic grammar since his work represents the culmination of modistic doctrine. His terminology and system do vary in relation to other Modistae, but his grammar is the ultimate modistic textbook (for details see Bursill-Hall 1990). A very readable survey of modistic grammar and its intellectual premises is to be found in Rosier (1983) and in Robins (1990); a good albeit brief account of the Modistae linking their grammars to medieval logic and semantics was written by Pinborg just before his death in 1982 (Kretzmann, et al. 1982: 254–69) as well as his *Entwicklung* (1967), and an excellent account of modistic syntax can be found in Covington (1984).

For the Modistae, the grammarian expresses in language his understanding of the world and its contents; he does this by means of the *modus significandi* (mode of signifying), but it is in fact by means of the active mode of signifying that the grammarian is able to use language as his mode of expression. His other tool is the *pars orationis* 'word class'; this is a grammatical expression and should be considered the correlative of things. The medieval grammarians argued that any thing or any being which the intelligence can understand can also be indicated by language. A thing may have many properties; a *pars orationis* may therefore have many modes of signifying, each of which will be used to signify some aspect or property of the thing. Its essential mode will describe its essence, and the accidental modes the external variations that may occur to its essence; these external variations allow the *pars orationis* to function at a higher level, i.e., syntactic level. The grammarian's concern is with these various modes of signifying and thus he is tied into the medieval philosopher's view of reality.

A modistic grammar consists of three parts or techniques; Proemium, Etymologia, and Diasynthetica. The Proemium was used to set out their technical vocabulary and/or analytical processes, or in the case of Thomas of Erfurt, to discuss the *modus significandi* which was for him and other Modistae the starting point of grammar. The Proemium can be divided into two parts, one of which has been labeled (Bursill-Hall 1971: 72–88) 'elements,' which consisted of *vox* 'expression,' *signum* 'sign,' *dictio* 'word,' and *pars orationis* 'word class,' and 'categories,' which consisted of *modus essendi* 'mode of being,' and *modus intelligendi* 'mode of understanding' (divided into active and passive), the *modus significandi* 'mode of signifying' (divided into active and passive), and the *modus consignificandi* 'mode of consignifying,' i.e., syntactically. The first series should be considered linguistic terms and the second (with the exception of the last one) as philosophical; the grammarian steps into the process making it linguistic with the *pars orationis*, the *modus significandi activus*, and the *modus consignificandi*.

The mode of signifying is divided into essential and accidental, the essential being divided further into general and specific, and the accidental into the various traditional accidents of grammatical analysis; a further division was into absolute and respective modes, the latter implying a syntactic function and the former has no such implication, e.g., *species* 'type' is an absolute mode but *casus* 'case' is a respective mode of the noun. The essential mode of signifying is the key to each *pars orationis* and the vital part of their grammatical system; it is here that there is the greatest apparent difference of organization among the Modistae. Siger de Courtrai, for example, divides his essential mode into general and specific, the general containing features which a particular word class shares with another, e.g., the *nomen* has the same general feature *ens* (being) as the *pronomen*, but the specific essential mode is peculiar to that particular class. In contrast, Thomas of Erfurt starts, so to speak, a little 'later'; he has no general essential mode to be shared with another word class. He divides his essential mode into *generalissimus*, *subalternus*, and *specialissimus*, so that his *modus significandi generalissimus* is roughly equivalent to Siger's *generalis* and *specificus*; he uses the *subalternus* 'subaltern' and *specialissimus* to refine his statements and, indeed, the *specialissimus* becomes in fact the inventory of the divisions into which the members of the class can be slotted.

Using the terminology and procedures just outlined, etymologia is that portion of the descriptive process that deals with the definitions of the word classes and their accidents. The Modistae retained the eight word classes of Latin as set out by Donatus and Priscian but, as can well be imagined, their criteria changed. The word classes were divided into declinables, i.e., *nomen*, *pronomen*, *verbum*, and *participium*; and indeclinables, i.e., *adverbium*, *coniunctio*, *praepositio*, and *interiectio*, the division being justified on the grounds that the indeclinable *partes orationes* had fewer modes of signifying, i.e., fewer formal features and hence their meaning rested on fewer properties, fewer modes of being (*modi essendi*) than the declinable classes. A mode of signifying is the means of expressing a mental concept, and a *pars orationis* is such by virtue of its modes of signifying; the mental concept derives its importance from the importance of the object under consideration, i.e., from the properties of the thing itself, and therefore the relative importance of the modes of signifying is a direct result of the relative importance of the things to be signified. As Boethius of Dacia stated, 'omnes modi significandi essentiales, et accidentales, generales et speciales accepti sunt a proprietatibus rerum' (All essential and accidental modes of signifying, both general and particular, are received from the properties of things). It is not surprising that *ens* (entity) and *esse* (being) became the most important properties and therefore the criteria for the noun and verb.

A brief look at the description of the *nomen* by Thomas of Erfurt will reveal a great deal about modistic practice. Thomas set up first of all the *modus essentialis generalissimus* which he defined as the mode of an entity and determinate understanding (*modus entis vel determinatae apprehensionis*). The noun shares the feature of *ens* with the pronoun; they are rendered discrete by virtue of the feature of *determinata apprehensio* in the noun in contrast to the *indeterminata apprehensio* of the pronoun. This is a good example of the way that the Modistae exploited the matter/form contrast adapted from contemporary hylomorphic theory. The *modus entis* represents the matter that the noun and pronoun share; the noun, however, is informed (*determinata apprehensio*) whereas the pronoun is only informable (*indeterminata apprehensio*). Siger used the feature of *ens* to describe the general mode which the noun and pronoun have in common and *apprehensio determinata* to describe the specific mode of the noun which is opposed to the specific mode of *apprehensio indeterminata* of the pronoun, i.e., in Siger's terms the noun and pronoun share the same general mode but are differentiated by the specific mode. Thomas was not concerned to exploit the opposition of matter and form so emphatically as Siger. His *modus generalissimus* combines the criteria of Siger's general and specific modes so that in Thomas's terms the *modus generalissimus* of the noun consists of the *modus entis et determinatae apprehensionis* and the *modus generalissimus* of the pronoun consists of the *modus entis et indeterminatae apprehensionis.*

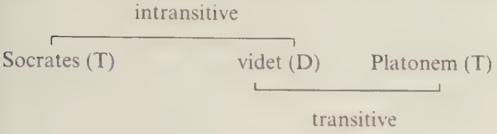
The *modus generalissimus* of the noun is then subdivided into *modi subalterni*, i.e., the *modus communis* (mode of commonness) which is the common or appellative noun and the *modus appropriati* or the proper noun; the common mode is further divided into two subalternate modes of signifying, i.e., *modus per se stantis* (mode of independence), the characteristic mark of the noun-substantive, and the *modus adiacentis* (mode of adherence), the characteristic mark of the adjective. The *modus per se stantis* is then divided into five *modi specialissimi* to produce five different types of substantives; the *modus adiacentis* is divided into 24 *modi specialissimi*, i.e., 24 different types of adjectives, and the *modus appropriati* is divided into four *modi specialissimi*, i.e., four different types of name—*nomen proprium*, *praenomen*, *cognomen*, *agnomen* (cf. Bursill-Hall 1971: 358). Thomas then describes the accidental modes of signifying of the nomen. Reference has already been made to the use of matter and form, terms taken from hylomorphic theory and incorporated into modistic technical language; the division of *essentialis* and *accidentalis* is one such pair of terms (one can add to these, pairs such as *actus* 'act' and *potentia* 'potentiality,' *ens* 'entity' and *esse* 'being,' the latter pair being the distinguishing criterion between the noun and verb). The accidental modes serve to express variations that can occur to the essence of the word class but which originate from without its essence. Thomas established six accidental modes: *species* (type), *figura* (form), *genus* (gender), *numerus* (number), *casus* (case), and *persona* (person), the first two being absolute modes and the others respective modes. These accidental modes are further subdivided and thus are found the accidents of traditional grammar.

One factor often overlooked in the account of the *partes orationis* is what appears to be an undue amount of attention to the analysis of the *nomen*. More than half of John of Dacia's *Summa grammatica* is devoted to an account of the *nomen*; Thomas of Erfurt devoted 12 pages (in the 1972 edition) to the general modes of signifying of the *nomen* compared to four pages for the *pronomen*, five pages for the *verbum*, and three for the *participium*, i.e., as much for the *nomen* as for the other three declinable *partes orationis*. For the Modistae, nomenclature, i.e., the property of naming, was a necessary part of a grammatical theory that was designed to talk about, classify, and categorize successfully the things of the world, e.g., the sacraments (Rosier 1990a).

The third stage of modistic description was diasynthetica (syntax), and here the Modistae were at their most original. One of the problems that the Schoolmen grammarians encountered in their commentaries on the Priscian Minor was that of putting order into the disorder of Priscian's account; not even Radulphus Brito could do this. Thomas did not attempt an account of Priscian's syntax; instead he established a framework which presents the rudiments of a formal model of sentence structure. Martin has a separate section for syntax in his treatise, Michel de Marbais wrote a Priscian Minor commentary which has recently come to light; Albertus and Gentilis de Cingulo both discuss syntactic problems but the most important treatise on syntax is that of Radulphus Brito. It is probably the most extensive discussion not only of Priscian's syntax but of syntactic problems and difficulties which had not previously yielded to analysis; this treatise itself awaits systematic exegesis. The edition of Radulphus also contains in the introduction a lengthy discussion of the logical and semantic theses of Radulphus Brito current among the Modistae.

Thomas's syntactic model can be divided into two parts: the principles of construing based on Aristotle's four causes (Metaphysics V, 2) of material, formal, efficient (subdivided into intrinsic and extrinsic), and final; and the application of these principles to an analysis of the three stages in the construction of a complete sentence. The three stages are *constructio* (construction), *congruitas* (congruity), divided into internal (according to the rules of rection) and external (according to the rules of collocational propriety), *perfectio* (completion) (divided into *propinquus* (primary) and *remotus* (secondary)), where *propinquus* requires the presence of a verb in a complete construction, and *remotus* that of generating perfect understanding in the mind of the hearer by means of a congruent combination of constructibles, one of which must be a verb.

This theory of syntax is an interesting example of the application of the binary principle. Just as *congruitas* and *perfectio* express a certain type of polarity, so too *constructio* can be divided into *transitivus* and *intransitivus*; each of these can be further divided into *actuum* (acts) and *personarum* (persons). Constructions which are of the *actuum* type are concerned with relations of the verb either to the subject or object and constructions *personarum* are not; therefore constructions of the NV type and of the VN type are *actuum* while relationships such as Nm (modifier) as in *homo albus* (the white man) or Va (adjunct) as in *currit bene* (runs well) would be *personarum*. A complete and perfect sentence must have all its syntactic dependencies complete; a sentence such as *si puer currit* (if the boy runs) would not be perfect because *si* adds a new dependency which is not completed. Thomas established the key terms *dependentia* and *determinatio* to express the relationship between members of a construction: the terminant (T) states the specific nature of the relationship and the dependent (D) specifies the type of relationship, so that *homo albus* is an intransitive *personarum* construction, T D; *legit bene* (reads well) would also be an intransitive *personarum*, T D; *puer currit* would be intransitive *actuum*, T D, so that *puer stultus legit lente* (the stupid boy reads slowly) would be analyzed as *puer stultus* = intransitive *personarum* + *legit lente* = intransitive *personarum*, and the whole sentence is intransitive *actuum*. A sentence such as *Socrates videt Platonem* 'Socrates sees Plato' (the Modistae were not very exciting in their choice of illustrations) would be analyzed:



If this were expanded to *Socrates felix videt Platonem tristem* ('Happy Socrates sees sad Plato'), this would mean that both *Socrates felix* and *Platonem tristem* would be intransitive *personarum* constructions. Covington (1984: 83) has properly called the modistic syntactic model a dependency grammar rather than a constituency grammar; for more details of their syntactic theory consult the edition of Thomas of Erfurt, and Robins (Koerner et al. 1980: 231–47).

The Modistae were the last in a long line of medieval grammarians. They were succeeded chronologically by the nominalist grammarians who, however, continued to use much of the technical terminology developed in the earlier period. Modistic grammars continued to be written but they added nothing new to grammatical or modistic theory. The demise of modistic grammar can be accounted for in part by the fact that modistic and nominalist grammarians (it is difficult to say if the latter added anything significantly new to grammatical theory) had nothing to say to each other, but this is not a sufficient explanation, nor is it sufficient to say that the humanist grammarians filled the gap, because their grammars did not appear until the fifteenth century. In fact very little is known about grammatical work in the northern schools in the later fourteenth and early fifteenth centuries. It is however safe to say that philosophers of this period, especially the Oxford Calculators, were not interested in grammar, and as E. J. Ashworth has pointed out (Kretzmann et al. 1982: 787), the fifteenth century did not produce much logical writing of importance, and by this time medieval scholasticism had lost much of its intellectual vigor. As W. K. Percival points out (Kretzmann et al. 1982: 816), it is not yet possible to claim an unbroken tradition between the grammars of the Modistae and those of the universalist grammarians of the seventeenth century.

It would be foolish to make too much of modistic and medieval theory. Their weaknesses are often obvious, e.g., their apparent inability to go beyond the simple declarative type of sentence. This is the wrong way to look at them. It is better to say that medieval grammar in general and modistic grammar in particular is a very important step taken quite a long time ago along the road towards the goal of an 'overall' theory of language, which has not yet been achieved.

4. Conclusion

The *Grammatica Speculativa* of Thomas of Erfurt was the last original treatise written in the modistic vein; 1300 may be taken as the probable date of composition. Thereafter, nothing of significance was produced. Yet, modistic texts continued to be read for some time, their terminology dominated, and even the humanist grammarians did not completely abandon modistic theory. There is in the monastic library of El Escorial a beautifully written version dating from the seventeenth century of the *Grammatica Speculativa* of Thomas of Erfurt. From 1300 onward different approaches to language description are to be found; these have been designated 'nominalist,' but the attacks on the Modistae came from scholars of different philosophical backgrounds. Two names stand out, Johannes Aurifaber (fl. ca.1330), a Master at Erfurt and an Averroist, and Petrus Alliacus (Pierre d'Ailly, 1350–ca.1421), an Ockhamist and author of *Destructiones Modorum Significandi*. Were they the *Junggrammatiker* of the Middle Ages?

There are external reasons for the failure of the Modistae; there were internal reasons too. A linguistic theory without a phonological technique cannot succeed. The Modistae did not realize that giving a language such as Latin a privileged status could not alter the fact that a natural language is totally inadequate as a model for universal grammar; this separated the Modistae from Roger Bacon who argued for a much wider study of other languages. Part of the problem for the Modistae was their reliance on Priscian as their model; their criteria for describing the word classes of Latin were an improvement, but they (like their predecessors) could not cope with Priscian's unsystematic account of Latin syntax. There are other reasons, not the least of which was the rigor of their method and their requirement of clear definitions.

Historians of medieval linguistics have tended to overlook the purpose of much medieval grammatical thought; this is no animadversion of their work which has concentrated on the developments in grammatical theory (and there is still much more to be done to clarify developments between 1150 and 1250). The Schoolmen grammarians knew that natural language was sufficient to express their experience of the physical world as they knew it, but they also recognized that something more finely honed was needed if they were to be successful in talking about theological problems, the nature of God, or the meaning of the sacraments. In this context, the work of a number of historians of linguistics, e.g., the late F. P. Dinneen, SJ (Georgetown), L. G. Kelly (Ottawa), and especially Irène Rosier (Paris), is important. They have been examining the way that medieval theologians used grammatical analysis as taught by the speculative grammarians to analyze, interpret, and explicate fundamental liturgical and theological problems. Much more knowledge is needed about the way that the ideas of medieval grammarians were used in medieval everyday life.

The study of grammar qua grammatical theory in the thirteenth and fourteenth centuries broke away from the study of literature; literature was excluded from the curriculum of the Northern universities, the result being a closer association with logic. The association of language study with literature or logic does affect the type of illustration used. Prior to the thirteenth century, grammarians took their illustrations from classical literature and Ralph of Beauvais (fl. 1175) was the last medieval grammarian to use examples from Latin literature for illustration. It is interesting to note that Peter Helias (twelfth century) quotes inter alia from Cicero, Horace, Juvenal, Ovid, Livy, Terence, and Vergil; Ralph of Beauvais from Horace, Juvenal, Ovid, Terence, and Vergil; and Robert Kilwardby (in his commentary on Donatus) from Cicero, Horace, Lucretious, Terence, Varro, and extensively from Vergil, whereas of the Modistae, Boethius of Dacia, John of Dacia, Radulphus Brito, Thomas of Erfurt have nothing, Martin of Dacia has one example from Ovid, and their illustrations are to say the least soulless and uninspiring. 'Robins (1990: 99) has described these examples as formulaic without regard to actual utterance or to situational plausibility.' The same criticism can be directed at a great many modern linguists. The result of the full incorporation of Aristotelian logic into the university programme and the control imposed by the creation of the statutes of the Sorbonne in mid-thirteenth century (a practice followed by Oxford and Cambridge) resulted in a complete separation of the study of *grammatica speculativa* and literature—the separation is well described in Henri d'Andeli's poem 'La Bataille des Set Ars.' Despite the fact that according to Curtius (1963: 54–57) the study of the *auctores* was still alive in the thirteenth century, the application of Aristotelian logic to the study of language had a profound effect and the enthusiasm engendered was to last until well into the fourteenth century by which time Scholasticism itself had begun to lose its vigor. One result of this change was that the speculative grammarians were not interested (at least not directly) in the problem of literacy. At the same time it must be recognised that if we are to understand developments in medieval literary culture, we need to know more about the 'literary' grammars of the period.

Therefore we need more detailed exegeses of literary grammarians such as Alexander de Villa-Dei, Eberhardus Bethuniensis, John of Garland, Hugo Spechtsart, Johannes Balbis de Janua, Ludolfus de Luckowe, Petrus de Isolella, to mention but a few. Many of these grammars were written in verse form, presumably because it was easier for students to memorize them. The best known of these grammars is the Doctrinale of Alexander de Villa-Dei, written circa 1200; it was intended as a replacement for Priscian's grammar but this was not officially the case until 1366 when the Doctrinale replaced Priscian in the statutes of Paris—Priscian continued to be read, however the relevant manuscript tradition contains many versions of these grammars, especially of the Doctrinale, which have been fully reported (Bursill-Hall 1981); a great many are accompanied by commentaries which are in fact commentaries on Priscian or on Modistic grammar. Apart from these commentaries they have little to offer the student of medieval grammatical theory.

Medieval grammatical thought has its own intrinsic interest, but it offers something else of importance to the modern linguist and historian of ideas. The Modistae were convinced that theirs was a coherent linguistic theory. It was the first attempt in Western Europe to create a fully fledged linguistic theory; it was not a theory of language, although speculative grammar, on which the Modistae constructed their grammatical theory, was, by virtue of its name, a theory of language. They both eventually failed. There is much for the intellectual world of the late twentieth century to learn from this.

Bibliography

Medieval grammatical literature

1. Texts

We have texts for a number of medieval grammatians; of the pre-modistic grammarians we have texts of Peter Helias (Reilly 1993), Ralph of Beauvias (Kneepkens 1982, 1991), Peter Hispanus (non-Papa; Kneepkens 1987), Robert Blund (Kneepkens 1987), Robert de Paris (Kneepkens 1987), Jordan of Saxony (Sirridge 1980); Roger Bacon (Nolan & Hirsch 1902; Steel 1940), Robert Kilwardby (Judy 1976; Schmücker 1984; Pinborg et al. 1975). Of the Modistae, we have texts of Boethius of Dacia (Pinborg & Roos 1969), Martin of Dacia (Roos 1961), John of Dacia (Otto 1955), Simon of Dacia (Otto 1963), Michel de Marbais (Kelly 1995), Radulphus Brito (Enders & Pinborg 1980), Pseudo-Albertus (Kelly 1977), Gentilis da Cingolo (Vico 1985), Siger de Courtrai (Pinborg 1976), Thomas of Erfurt (Bursill-Hall 1972). Of post-modistic grammarians, we have texts of Johannes Aurifaber (Pinborg 1967), Petrus Alliacus (Kaczmarek 1980); this list is not exhaustive, and editions of normative grammars have not been included.

2. Studies

Bursill-Hall G L 1971 *Speculative Grammars of the Middle Ages: The Doctrine of partes orationis of the Modistae.* Mouton, The Hague

Bursill-Hall G L 1975 The Middle Ages. In: Sebeok T A (ed.) *Current Trends in Linguistics.* Mouton, The Hague

Bursill-Hall G L 1981 *A Census of Medieval Latin Grammatical Manuscripts*, Grammatica speculativa 4. Frommann-Holzboog, Stuttgart-Bad Cannstatt

Bursill-Hall G L, Ebbesen S, Koerner E F K (eds.) 1990 *De Ortu Grammaticae: Studies in Medieval Grammar and Linguistic Theory in Memory of Jan Pinborg.* Benjamins, Amsterdam

Covington M A 1984 *Syntactic Theory in the High Middle Ages: Modistic Models of Sentence Structure.* Cambridge University Press, Cambridge

Curtius E R 1963 *European Literature and the Latin Middle Ages.* Harper, New York

Hunt R W 1980 *The History of Grammar in the Middle Ages: Collected Papers.* Benjamins, Amsterdam (Ed. by Bursill-Hall G L)

Irvine K 1994 *The Making of Textual Culture: 'Grammatica' and Literary Theory, 350–1100*, Cambridge Studies in Medieval Literature 19. Cambridge University Press, Cambridge

Kelly L G 1979 Modus significandi: An interdisciplinary concept. *Historiographia Linguistica* **VI**: 159–80

Kneepkens C H 1988 'Suppositio' and 'Supponere' in the 12th century grammar. In: Jolivet J, de Libera A (eds.) *Gilbert de Poitiers et ses contemporains*, Actes du 7me symposium européen d'histoire de la logique et de la sémantique médiévale. Bibliopolis, Rome

Knowles D 1988 (1st edn. 1962) *The Evolution of Medieval Thought.* Longman, London

Koerner E F K, Niederehe H-J, Robins R H (eds.) 1980 *Studies in Medieval Linguistic Thought: Dedicated to Geoffrey L Bursill-Hall.* Benjamins, Amsterdam

Kretzmann N, Kenny A, Pinborg J (eds.) 1982 *The Cambridge History of Later Medieval Philosophy.* Cambridge University Press, Cambridge

Leader D R 1988 *A History of the University of Cambridge*, vol. I, *The University to 1546.* Cambridge University Press, Cambridge

Leff G 1975 *Paris and Oxford Universities in the Thirteenth and Fourteenth Centuries.* Krieger, Huntington, NY

Marmo C 1994 *Semiotica e linguaggio nella Scolastica: Parigi, Bologna, Erfurt 1270–1330. La semiotica dei Modisti.* Istituto Palazzo Borromini, Rome

O'Mahoney B E 1964 A Medieval Semantic: The Scholastic 'Tractatus de Modis Significandi.' *Laurentianum* **5**: 448–486

Pinborg J 1967 *Die Entwicklung der Sprachtheorie im Mittelalter. Beiträge zur Geschichte det Philosophie und Theologie des Mittelalters* **42**: 0. Aschendorff, Münster; Frost-Hansen, Copenhagen

Pinborg J 1984 *Medieval Semantics: Medieval Logic and Grammar.* Variorum, London (Ed. by Ebbesen S)

Rijk L M de 1967 *Logica modernorum: A Contribution to the History of Early Terminist Logic.* Van Gorcum, Assen

Robins R H 1980 Functional Syntax in Medieval Europe. *Historiographia Linguistica* **7**: 231–40

Robins R H 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Rosier I 1983 *La grammaire spéculative des Modistes.* Presses Universitaires de Lille, Lille

Rosier I (ed.) 1988 *L'héritage des grammairiens latins de l'Antiquité aux Lumières*, Actes du colloque de Chantilly, 2–4 Septembre 1987. Peeters, Louvain

Rosier I 1990a Signes et sacrements. Thomas d'Aquin et la grammaire spéculative. *Revue des sciences philosophiques et théologiques* **74**: 392–436

Rosier I 1990b Grammaire (1971–88). *Contemporary Philosophy. A New Survey* **6(2)**: 783–803

Thurot Ch 1988 *Notices et extraits de divers manuscrits latins pour servir à l'histoire des doctrines grammaticales du moyen âge*, Notices et extraits des manuscrits de la bibliothèque impériale 22. Imprimerie impériale, Paris. Repr. 1964 Minerva, Frankfurt

Medieval Language Philosophy

Dominik Perler

The origin and development of the philosophy of language in the Middle Ages—roughly speaking, in the period between Boethius (480–524) and John Mair (1467/69–1550)—was closely linked to the translation and interpretation of ancient texts. Most theories on the semantics of terms and propositions grew out of commentaries on such authoritative books. These theories relied on the basic assumption that language, thought, and reality were naturally related to each other. Like their ancient predecessors, the medievals considered language to be not only an instrument of communication, but also a system of signs representing the structure of mental and extramental reality. Thus, the analysis of the semantic function of language was supposed to provide a deeper understanding of reality itself.

1. Sources and Stages of Development

The most influential body of authoritative texts in the Middle Ages was Aristotle's Organon; its first treatise, the *Categories*, provided the basis for a theory of uncomplex linguistic signs, and its second treatise, *De interpretatione*, was the starting point for a theory of complex signs. These two works (translated into Latin with commentaries by Boethius), accompanied by Porphyry's *Isagoge* (an introduction to the *Categories*), were the main sources of the old logic (*logica* *vetus*), which was fully elaborated for the first time in the *Dialectica* of Garlandus Compotista (died before 1102) and culminated in the School of Chartres and in Peter Abelard (1079–1142/44) (see Tweedale 1988; Jacobi 1988). The new translations or retranslations of the four other works of the Organon (*Prior* and *Posterior Analytics*, *Topics*, *Sophistical Refutations*), which entered the Latin West in the twelfth century, constituted the textual basis of the *logica nova*, a logic that focused especially on the theory of linguistic fallacies. Together, the old and the new logics formed the *logica antiqua*, which was replaced by the *logica moderna* in the late twelfth century. Since the *logica moderna*, which reached its full-fledged stage in the works of William of Sherwood (1200/10–66/72), Peter of Spain (d.1277), and Lambert of Auxerre (fl.1250), was distinguished by detailed analysis of the properties of terms, it was also called 'terminism' (see Rijk 1967; Pinborg 1972: 13–18). Around 1300, the dominance of terminism was weakened by the Modistae, who introduced extensive grammatico–psychological analyses into semantic theory (Pinborg 1975; Marmo 1994).

An important transformation occurred in the early fourteenth century. On the basis of the ontological claim that only individual, really existing substances and accidents are beings in a strict sense, William of Ockham (1285–1347/49) elaborated a semantic theory which explained any linguistic reference as a reference to individual beings. This theory, labeled the *via moderna*, sparked a controversy that dominated university discussions of the fourteenth and fifteenth centuries (see Biard 1989: 203–88; Kaluza 1988). At the same time, humanist dialecticians, including Lorenzo Valla (1407–57) and Rudolphus Agricola (1443/44–1485), began emphasizing the rhetorical and pragmatic function of language, opposing the logico–semantic approach to language (see Jardine 1988: 173–76). However, the humanist approach did not simply supersede the logical approach characteristic of the Aristotelian tradition. A continuous scholastic tradition, especially active in Spain and Britain, transmitted medieval concepts to modern philosophers such as John Locke and G. W. Leibniz (see Ashworth 1988: 153–72).

Although the ideas of Aristotle exerted a strong influence on medieval thought, scholastic philosophy of language should not be identified with Aristotelianism. Its development was also markedly influenced by Augustine's theory of signs (developed in his *De doctrina christiana* and *De trinitate*), by later ancient grammar (especially Priscian's *Institutiones grammaticae*; see also *Roman ars grammatica, including Priscian*), and by a Neoplatonic tradition (transmitted by Boethius' theological treatises) which was particularly evident in the semantics of Gilbert of Poitiers (1085/90–1154) and William of Conches (ca.1085–after 1154). Scholastic philosophy of language, therefore, did not simply continue one tradition, but critically examined several interconnected traditions, thus bringing about the most innovative achievements in medieval linguistic theory.

2. The Properties of Terms

Following Priscian, medieval grammarians and logicians divided words into two main classes. First, any word that can be used as subject or predicate in a proposition and which has by itself a significative force is a categorematic term. (Strictly speaking, a term is one or the other end (*terminus*) of a subject–predicate proposition.) Included in this class are nouns, adjectives, verbs, and personal and demonstrative pronouns. Second, any word that can be used with a significative force only in connection with a subject–predicate pair is a syncategorematic word. Included in this class are prepositions, adverbs, conjunctions, etc. For example, the propositions 'Only Socrates is running' and 'Socrates is contingently running' each contain a syncategorematic word, since the quantifier 'only' and the modal functor 'contingently' cannot be used significantly unless they are attached to the subject term 'Socrates' in respect of the predicate term 'is running' (see Kretzmann 1982: 211–28).

A clear understanding of the logical function of syncategorematic words is particularly important in distinguishing names from pseudo-names, as Anselm of Canterbury's (1033–1109) analysis of the proposition 'Nothing taught me to fly' (*Nihil me docuit volare*) illustrates. 'Nothing' seems to be used as a name, so that one could be led to make the odd inference that something or somebody called 'Nothing' taught me to fly. But if one realizes that 'nothing' is a syncategorematic word which performs the office of propositional negation, one can avoid the logical mistake by reformulating the proposition as follows: *Non me docuit aliquid volare*—'It is not the case that something taught me to fly' (see Henry 1967: 211–218).

However, the list of syncategorematic words was not confined to logical operators. It also included expressions signifying the starting and ending points of a movement or action (e.g., 'begins,' 'ceases'). During the twelfth century, the reception of Aristotle's *Sophistical Refutations*, a treatise on fallacies, stimulated interest in such expressions, for fallacies arise when the logical relationships among all the words—particularly the syncategorematic words—occurring in a syllogism are insufficiently analyzed. For instance, the *Fallacie Parvipontane* (an anonymous treatise from the late twelfth century) offers the following example of a fallacy of division: 'Those two men cease to be; if anyone ceases to be, he dies; therefore those two men die.' The fallacy consists in the fact that in the first premise the word 'cease' is said of the pair of men, but in the second of only one man, so that the conclusion fails in claiming that each of those men dies when only one of them dies (see Kretzmann 1976: 105–106).

In the thirteenth century, William of Sherwood, Nicholas of Paris (fl.1250) and others identified the semantics of syncategorematic words as a specific set of topics and discussed them in separate treatises. In the fourteenth century these discussions were absorbed into the sophismata-literature, which tried to explain paradoxes caused by the confusing use of syncategorematic words (see Read 1993). The strategies for dissolving the paradoxes may be recognized as an attempt to analyze by linguistic means problems associated not only with logic but also with metaphysics or natural philosophy. For instance, as regards the sophisma 'Socrates is infinitely whiter than Plato begins to be white'—an example discussed by Richard Kilvington (ca.1305–61)—an analysis of the syncategorematic words 'infinitely' and 'begins' was supposed to make understandable the comparison of a definite degree of a quality (white) in one substance (Socrates) with the state of another substance (Plato) considered at the instant at which its acquisition of that quality begins (see Kretzmann & Kretzmann 1990: 153–55).

The analysis of the use of syncategorematic words was linked to an investigation of the functions or properties of categorematic terms. In the *logica vetus* Anselm of Canterbury distinguished two main functions: the *appellatio* of a term is the actual indication or the naming of its referents, whereas the *significatio* conveys the understanding or concept (*intellectus*) expressed by the definition of the term. Thus, the term 'man' names (*appellat*) all individual human beings, but it signifies the concept of a rational, mortal animal. This important distinction was used by Peter Abelard in order to explain that a term can be used significantly even if there is no referent. In winter, Abelard writes, when there are no roses, the term 'rose' has no *appellatio* but it nevertheless preserves its *significatio*, since the understanding of the concept *rose* does not depend on the present existence of individual roses (see Rijk 1967: 190–99).

Gilbert of Poitiers also adopted the distinction between *appellatio* and *significatio*, but with respect to nouns—one kind of categorematic term—he claimed that two aspects of signification are to be taken into account: a noun conveys not only an understanding of a thing as such (*id quod est*) but also of the essential quality by virtue of which it is this particular thing (*id quo est*). Thus, 'man' signifies not only a particular human being, but also the humanity by virtue of which every man is a man, and 'stone' signifies not only a particular stone, but also the 'stone-ness' by virtue of which every stone is a stone (see Rijk 1987: 161). This claim is influenced by a Platonic ontology which posits universal beings with real, distinct existence in addition to particular beings.

The *logica moderna* provided a more detailed semantic theory avoiding such strong Platonic claims. This theory recognized four properties of terms (see Maierù 1972: 47–317; Spade 1982): (a) 'signification' is the capacity of a term to bring something to the mind, i.e., to establish an understanding of a thing. This property applies to all categorematic terms; (b) 'supposition' is the reference of a categorematic term or its 'standing for' (*stare pro*) something, applying only to subjects and predicates (many Continental logicians of the thirteenth century attributed it exclusively to substantives) and therefore determined by the actual use of a term in a syntactical context; (c) 'copulation' is the referential function of a dependent categorematic term (an adjective or a participle) linked with a substantive; and (d) 'appellation' is the reference of a categorematic term to an actually existing thing.

Obviously, one cannot attach the same importance to all four properties, since copulation and appellation are subordinate to supposition; copulation applies to a subclass of all suppositing terms, and appellation is a temporal restriction of supposition. For that reason, fourteenth-century authors focused almost exclusively on signification and supposition. These two properties provide the basis for a theory that is not purely logico–semantic, since signification—the establishment of an understanding—is an epistemologico–psychological property of a term.

Logicians in the thirteenth and fourteenth centuries distinguished three main sorts of supposition (for a schematic presentation, see Maierù 1972: 306–317). First, a subject or predicate term can stand for something of which it is truly predicable (in most instances an extramental thing), e.g., 'Socrates' in 'Socrates is a man.' The subject standing for an individual human being is said to have 'personal supposition.' Second, a subject or predicate term can also stand for a spoken or written expression, e.g., 'man' in 'Man is a monosyllable.' In this case, the subject is said to have 'material supposition.' And finally, a subject or predicate term can stand for a universal, e.g., 'man' in 'Man is a species,' where the subject is said to have 'simple supposition.' This third kind of supposition apparently presupposes the existence of universals and therefore has strong ontological commitments. It was redefined by nominalist authors of the fourteenth century, who claimed that the simple supposition of a term is confined to its reference to a concept (see Michon 1994: 213–44).

It is important to note that supposition was considered a propositional property of a term. The isolated noun 'man,' for instance, has no supposition at all. Thus medieval authors from the late twelfth century onwards distinguished themselves by a 'contextual approach' to supposition (see Rijk 1967: 113–117). They assigned a referential function not to single words but to the parts of a proposition. One exception to this general rule is the 'natural supposition' which was defined by Peter of Spain as the acceptance of a common substantival term for all those individuals which participate in the universal form signified by the term. So the term 'man' supposits naturally—i.e., by itself, without a propositional context—for all past, present, and future human beings participating in the universal *man*. Many fourteenth-century logicians however, including William of Ockham, Walter Burley (ca.1275–1344/45), Marsilius of Inghen (ca.1330–96), and Albert of Saxony (d.1390), rejected such non-propositional supposition (see Rijk 1973: 45).

The principal threefold division of supposition was followed by a subdivision of personal supposition. This second part of supposition-theory was an attempt to 'descend' by logical inference from the referring term to its ultimate, singular referents (see Spade 1988). Only some terms (e.g., 'Socrates' in 'Socrates is running') have a 'discrete supposition' that is, a reference to one precise thing. Other terms have a 'common supposition' since they stand for a plurality of singular things. Such a common supposition is either determinate (*determinata*) or confused (*confusa*). In the proposition 'A man is running' the subject has a determinate common supposition, because there is no indication which man is running, so that the proposition can be verified by any single instance, and we can say 'This man or that man or some other man is running.' But in the proposition 'Man is an animal' the subject has a confused common supposition since every man is an animal, and we have to say 'This man and that man and that man, etc., is an animal,' i.e., we distribute the common term to singular referents.

Supposition-theory provided not only a detailed theory of reference but also served as the basis for a theory of truth-conditions. According to Ockham, a singular, particular, or universal affirmative proposition is true if and only if the subject and the predicate terms supposit for the same thing (see Adams 1987: 385–96; Perler 1992: 109–25). 'Socrates is white,' for instance, is true if and only if 'Socrates' and 'white' stand for the same individual thing. It is clear, however, that 'white' does not stand exclusively for an individual thing but also indicates that this thing has a certain property. Ockham took account of this difference by introducing a distinction between absolute and connotative terms: 'Socrates,' an absolute term, supposits for Socrates and signifies the substance Socrates. But 'white,' a connotative term in this proposition, stands for Socrates and connotes (or signifies secondarily) the quality white; 'white' can be nominally defined as 'something having whiteness.' Thus 'white' stands for Socrates, but by virtue of its connotation it makes one think of the whiteness inhering in Socrates. This explanation is intended to avoid positing a universal for which 'white' would have to supposit.

In the middle of the fourteenth century, logicians paid special attention to the semantic function of verbs expressing an epistemic act ('to know,' 'to doubt,' 'to recognize,' etc.). John Buridan (1295/1300–58) claimed that these verbs always imply an *appellatio rationis* of the terms with which they are combined. But this *appellatio* applies differently to the terms preceding and following the verb. For example, in 'I recognize the approaching man' ('*Cognosco venientem*') the verb makes the postposited term name (*appellare*) only the *ratio* that someone is coming, whoever that person might be. In 'Regarding the approaching man, I recognize him' ('*Venientem cognosco*') instead the verb makes the preposited term name all the *rationes* of the approaching person. So the second proposition expresses not only that I recognize that someone is approaching, but also that I recognize this person as having certain features, for instance, as being my teacher or my father (see Nuchelmans 1988: 68–71). This is an attempt to explain how the word-order affects the semantic function of a particular class of terms. Such an analysis may thus be recognized as a transition from a theory of terms to a theory of propositions, since it establishes the properties of one term by analyzing the syntactic structure of the proposition in which the term is used.

3. The Semantics of Propositions

When the medievals analyzed a proposition (*propositio*) they were not speaking of the mere content of an indicative sentence (the standard twentieth-century philosophical use of 'proposition') but of a predicative composition of terms accompanied by an act of judging or asserting. After Abelard, two opposing theories were put forward in order to explain the function of the copula 'is' in 'S is P' (see Malcolm 1979). According to the inherence theory (defended by the majority of the thirteenth-century authors), the copula indicates that the referent of the predicate inheres in the referent of the subject; e.g., in 'Socrates is a man' the copula indicates that the species *man* is in the individual Socrates. The identity theory, on the other hand (held by most fourteenth-century authors), claims that the copula just points out that subject and predicate refer to the same object; in 'Socrates is a man' the copula makes plain that 'Socrates' and 'man' are both referring to Socrates who is an individual man. The two explanations of the semantic function of 'is' are obviously based on divergent ontological conceptions. Whereas the inherence theory posits a universal existing in an individual substance, the identity theory holds that an individual substance and an individual property are actually connected.

Like the terms (the integral parts of a proposition), every spoken or written proposition was said to have a mental counterpart, a *propositio mentalis*, composed of concepts. In addition to this traditional division, Walter Burley introduced another kind of proposition: the *propositio in re*, that is, extramental things insofar as they are thought of as being composed or divided by an affirming or denying predicative act (see Nuchelmans 1973: 219–25).

In accordance with Boethius, the medievals defined the proposition as an expression signifying what is true or false (*oratio verum falsumve significans*). This *oratio* was generally taken to be an instance of a proposition (in modern terminology: a sentence-token). The strict consequences of this thesis were explicitly formulated by Robert Holcot (ca.1290–1349), who claimed that a proposition cannot be said to be true or false unless it is actually thought, spoken, or written (see Perler 1992: 162–168). This claim raises the problem that even a proposition expressing a necessary truth, e.g., 'Man is an animal,' will be true only at the moment it is thought, spoken, or written by at least one person. Holcot's extreme claim was not widely accepted. Paul of Venice (1369–1429) later admitted not just sentence-tokens but also sentence-types as propositions by introducing a slight modification into the Boethian definition: a proposition is an expression *capable* of signifying what is true or false. From this point of view, it is not a thought, or a spoken, or a written instance of 'Man is an animal' that is said to be true, but rather the necessary predication of the genus *animal* of the species *man* expressed by the proposition, whether or not the proposition actually exists in thought, speech, or writing (see Nuchelmans 1973: 203–208 and 266–271).

In asserting that a proposition signifies, the medievals were confronted with the problem of explaining what its significate is (see Kretzmann 1970). In general, they assigned three functions to the significate: (a) in an assertoric proposition, it is that which is expressed as being true or false; (b) in a modal proposition, it is that which is expressed as being necessary, possible, contingent, or impossible; (c) in an affirmative proposition governed by an epistemic verb, it is that which is said to be known, doubted, believed, etc. In all three cases the significate is linguistically marked by a 'that'-clause (in Latin an *accusativus cum infinitivo*); e.g., in 'It is true (or: It is contingent, or: I know) that Socrates is running' the significate is 'that Socrates is running.'

Abelard had already noticed that the significate (which he called the *dictum* or *enuntiabile* of a proposition) is not a substance or a quality accessible to the senses, but that it nevertheless exists, since it can be grasped by reason (see Libera 1981). The anonymous author of the twelfth-century *Ars Meliduna* labeled this peculiar being an extracategorical thing (*extrapraedicamentale*) belonging to a separate category of being not among the ten categories distinguished by Aristotle.

In the fourteenth century, philosophers again eagerly discussed the ontological status of the significate (see Nuchelmans 1973: 195–271; Perler 1994). According to the *res*-theory, held by Walter Chatton (1285–1344) and André Neufchâteau (fl.1360), that which is true or contingent or known is the thing signified by the terms of the proposition. Thus the significate of 'Socrates is running' is the running Socrates himself. This position succeeds in explaining propositions about actual, existing things but it can hardly explain propositions about fictive things or abstract states of affairs, for what thing could be the significate of the proposition 'The chimera is white' or 'The whole is equal to the sum of its parts'? The *complexum*-theory, held by Ockham, Robert Holcot, and John Buridan, tried to avoid this difficulty by claiming that the significate is nothing other than the composition of the terms—not simply the composition of spoken or written terms (in which case the significate would be a purely linguistic entity), but of mental terms signifying immediately and naturally extramental things. But this solution requires a potentially vast number of significates for one proposition, since every person thinking 'Socrates is running' forms his or her own mental terms and has therefore his or her own *complexum*. Adam Wodeham (ca.1298–1358) and Gregory of Rimini (ca.1300–58) rejected both theories and claimed that the total and adequate significate is something peculiar, a *complexe significabile*, which can be expressed only by a whole proposition. It is neither a being in a narrow sense (substance or quality) nor a nonbeing but rather a being of its own: something which positively or negatively is the case. Thus 'Socrates is running' signifies that-Socrates-is-running, a being which is neither the running Socrates the terms 'Socrates' and 'is running' stand for, nor the terms themselves. This explanation, which shows some similarity with Abelard's *dictum*-theory (although there is no textual evidence for a direct link between them), is apparently an attempt to establish an ontological category for states of affairs distinct from those for mental and extramental things.

4. Epistemological and Ontological Commitments

Taking their cue from Aristotle's *De interpretatione*, 1 (16a 3–8) and from Augustine's *De trinitate* XV, 10–11, most medieval authors held that the spoken and written terms which signify conventionally are correlated with mental terms (or concepts or intentions) which signify naturally. This correlation was taken to be a signification relation. The crucial question was whether the signification should be explained on the basis of an epistemological representationalism (i.e., conventional terms signify primarily mental terms and secondarily things insofar as they are represented by mental terms) or on the basis of a direct realism (i.e., conventional terms as well as mental terms directly signify things as they are in reality).

Following Boethius, many thirteenth-century commentators—among them Albert the Great (ca.1200–1280) and Thomas Aquinas (1225–74)—claimed that a conventional term signifies the corresponding mental term as its first, direct significate (*primum sig-*

nificatum) and the thing as its ultimate, indirect significate (*ultimum significatum*). But there are some conventional terms, e.g., 'Caesar' or 'Antichrist,' that have no ultimate significate, since Caesar does not exist anymore and the Antichrist does not yet exist. Nevertheless, these terms do not lose their signification, since they have first significates, namely the mental terms *Caesar* and *Antichrist*.

Roger Bacon (ca.1214–92/94) sharply criticized this explanation, claiming instead that every conventional categorematic term signifies immediately and exclusively the thing itself. He denied that 'Caesar' or 'Antichrist' have a signification, because there is no actually existing significate (see Maloney 1983). John Duns Scotus (ca.1265–1308) also rejected the traditional interpretation, but without agreeing with Roger Bacon's strong extensionalistic thesis. He asserted that a categorematic term signifies the thing directly, however, not the thing insofar as it exists (*res ut existit*) but insofar as it is understood (*res ut intelligitur*). In contrast to the concept, this significate is not a psychic entity (*qualitas animae*) depending on a mental act; 'Caesar' signifies Caesar as he is understood even if no one actually thinks about Caesar. The significate is rather the nature of a thing expressed by its definition and distinct from the existing thing as well as from the concept (see Marmo 1989: 160–64; Libera 1991).

Ockham followed Duns Scotus in rejecting the representationalistic explanation offered by Boethius and his followers, but he insisted that there is no formal distinction between the individual existing thing and its nature. He claimed that a categorematic term signifies and refers to (*supponit*) a singular thing existing in reality. He granted that Caesar or a chimera can be signified, since one can have an understanding of a dead or fictive being. However, reference to such beings—technically speaking, *suppositio*—is impossible (see Biard 1989: 74–96).

Referring to Augustine's statement that concepts are words in the heart (*verba in corde*), Ockham held that mental terms have all the grammatical features which are necessary for signification, without synonymy and equivocation. Thus, there are mental substantives, mental verbs, mental adjectives, etc., forming a mental language that has a syntax similar to Latin syntax (see Panaccio 1992). This idea of a mental language was extensively discussed by sixteenth-century scholastic authors, including Fernando de Enzinas (d.1523) and Domingo de Soto (1494–1560) (see Ashworth 1982).

William (or John, according to other sources) Crathorn (fl.1330) made a remarkable challenge to the whole tradition that assigned a natural signification to mental terms. He claimed that mental terms are not at all the most basic signs but only inner likenesses (*similitudines intrinsecae*) of spoken or written terms. According to this theory, when one utters the word 'man,' the mental term is nothing other than a quality in the mind following the spoken word (see Tachau 1987: 255–74).

At the end of the thirteenth and the beginning of the fourteenth century the ontological status of mental terms or concepts was the subject of a lively debate. Three main positions may be recognized (see Adams 1987: 73–107; Tachau 1987: 85–153). First, according to Duns Scotus and his followers, including William of Alnwick (fl.1315), a concept is a quality of the mind, having a subjective existence (*esse subiective*) since it exists in the soul as an accident exists in a subject. Second, Peter Aureol (ca.1280–1322), Hervaeus Natalis (1250/60–1323), and the early Ockham held that concepts are neither extramental nor purely mental entities but that they form a peculiar category of beings having an objective existence (*esse obiective*); they exist just in the way that they are objects of the mind. Finally, in the *Summa logicae* Ockham rejected his early view and claimed that concepts are nothing other than the acts of understanding (*actus intelligendi*) which exist just at the moment when the intellect is directed toward an object and apprehends it.

Since the medievals considered the predicative structure 'S is P' as a linguistic source of information regarding the structure of the things signified by the terms, their semantic analyses were closely linked with ontological theories. This link was particularly strong in the discussions of denominative terms. In accordance with Aristotle's *Categories*, 8 (10a 27ff.), a denominative term (or paronym) was defined as a term derived from a quality-term; e.g., 'grammatical' is derived from 'grammar,' and 'white' from 'whiteness.' But what does the denominative term signify: the quality or the subject in which the quality inheres? Both solutions seem to be unsatisfying. In the proposition 'Socrates is white,' for instance, 'white' signifies neither the quality whiteness absolutely (but precisely the whiteness inhering in Socrates) nor the subject Socrates absolutely (but precisely Socrates insofar as he is white). Anselm of Canterbury recognized this problem and discussed it extensively in his dialog *De grammatico*. He said that a satisfactory answer requires a distinction between two semantic functions: 'white' signifies being in possession of whiteness (*habens albedinem*) and at the same time names (*appellat*) something white, namely, Socrates himself. It is important to note that being in possession of whiteness is not something in possession of whiteness; 'white' signifies only the quality-category and the dependence structure of this quality, but it does not signify the subject-category on which the quality depends (see Henry 1967: 31–116).

The late thirteenth century witnessed a renewed interest in the semantics of denominative terms. Four theories were generally discussed (see Ebbesen 1988: 117–44). First, according to Avicenna, 'white' signifies the combination of subject and quality, but the subject primarily and the quality only secondarily. This appeal to an ontological priority of the subject was generally rejected in the thirteenth century with an argument stemming from Averroes: if 'white' signified primarily the subject, it could be replaced by 'white body' so that we could form the proposition 'Socrates is a white body.' But again, 'white,' signifying primarily the body, is replaceable so that we could say 'Socrates is a white body body,' and so on to infinity. Second, according to the modistic approach accepted by Boethius of Dacia (fl.1275) and Duns Scotus, 'white' signifies only the quality, but by its mode of signifying it makes one understand the subject in which the quality inheres. Obviously, this position presupposes that denominative terms have a peculiar mode of signifying distinct from the modes of other terms, and it claims that the quality can be signified in a distinct way. The latter claim relies on the assumption—criticized by opponents—that a quality has two ways of being, namely, in its pure essence (*essentia*) and in its existing essence (*esse essentiae*); being white in the first way is signified by 'whiteness,' in the second way by 'white.' Third, Siger of Brabant (ca.1240–84) and Siger of Courtrai (d.1341) held that 'white' signifies both subject and quality, each under its own *ratio*, but the quality primarily and the subject secondarily. Finally, Simon of Faversham (ca.1260–1306) and Radulphus Brito (d.1320) held that 'white' signifies both subject and quality and both under the *ratio* of the quality. The last two theories make the controversial claim that the *ratio* of a subject or quality, i.e., its nature expressed by the definition, is ontologically distinguishable from the subject or the quality itself.

The controversy on denominative terms illustrates that medieval philosophy of language was not confined to a purely semantical analysis of language. In examining the question of *how* such terms signify things, the medievals sought to reach an answer to the question of *what* these and other terms signify. An understanding of the structure and functions of language was not a goal in itself. It was rather supposed to give some insight into the structure of reality and into the linguistic representation of this structure. Therefore it is important to see medieval philosophy of language not as an isolated discipline, but as a philosophical field interrelated with others (above all ontology and epistemology), aiming at giving a comprehensive description of reality.

Bibliography

Adams M M 1987 *William Ockham*. Notre Dame University Press, Notre Dame, Indiana

Ashworth E J 1982 The structure of mental language: Some problems discussed by early sixteenth-century logicians. *Vivarium* **20**: 59–83

Ashworth E J 1988 Traditional logic. In: Schmitt C B (ed.) *The Cambridge History of Renaissance Philosophy*. Cambridge University Press, Cambridge

Biard J 1989 *Logique et théorie du signe au XIVe siècle*. Librairie Philosophique J Vrin, Paris

Ebbesen S 1988 Concrete accidental terms: Late thirteenth-century debates about problems relating to such terms as '*Album*'. In: Kretzmann N (ed.) *Meaning and Inference in Medieval Philosophy*. Kluwer, Dordrecht

Henry D P 1967 *The Logic of Saint Anselm*. Clarendon Press, Oxford

Jacobi K 1988 Logic: The later twelfth century. In: Dronke P (ed.) *A History of Twelfth-century Western Philosophy*. Cambridge University Press, Cambridge

Jardine L 1988 Humanistic logic. In: Schmitt C B (ed.) *The Cambridge History of Renaissance Philosophy*. Cambridge University Press, Cambridge

Kaluza Z 1988 *Querelles doctrinales à Paris. Nominalistes et réalistes aux confins du XIVe et du XVe siècle*. Lubrina, Bergamo

Kretzmann N 1970 Medieval logicians on the meaning of the *propositio*. *The Journal of Philosophy* **67**: 767–87

Kretzmann N 1976 Incipit/Desinit. In: Machamer P K, Turnbull R G (eds.) *Motion and Time, Space and Matter*. Ohio State University Press, Columbus, Ohio

Kretzmann N 1982 Syncategoremata, sophismata, exponibilia. In: Kretzmann N, Kenny A, Pinborg P (eds.) *The Cambridge History of Later Medieval Philosophy*. Cambridge University Press, Cambridge

Kretzmann N, Kretzmann B 1990 *The Sophismata of Richard Kilvington*. Cambridge University Press, Cambridge

Libera A de 1981 Abélard et le dictisme. *Cahiers de la Revue de théologie et de philosophie* **6**: 59–97

Libera A de 1991 *César et le Phénix. Distinctiones et sophismata parisiens du XIIIe siècle*. Scuola Normale Superiore, Pisa

Maierù A 1972 *Terminologia logica della tarda scolastica*. Edizioni dell'Ateneo, Rome

Malcolm J 1979 A reconsideration of the identity and inherence theories of the copula. *Journal of the History of Philosophy* **17**: 383–400

Maloney T S 1983 The semiotics of Roger Bacon. *Mediaeval Studies* **45**: 120–54

Marmo C 1989 Ontology and semantics in the logic of Duns Scotus. In: Eco U, Marmo C (eds.) *On the Medieval Theory of Signs*. Benjamins, Amsterdam

Marmo C 1994 *Semiotica e linguaggio nella scolastica: Parigi, Bologna, Erfurt 1270–1330. La semiotica dei Modisti*. Istituto storico italiano per il medio evo, Rome

Michon C 1994 *Nominalisme. La théorie de la signification d'Occam*. Vrin, Paris

Nuchelmans G 1973 *Theories of the Proposition: Ancient and Medieval Conceptions of the Bearers of Truth and Falsity*. North-Holland, Amsterdam

Nuchelmans G 1988 *Appellatio rationis* in Buridan, *Sophismata, IV, 9–15*. In: Pluta O (ed.) *Die Philosophie im 14. und 15. Jahrhundert*. Grüner, Amsterdam

Panaccio C 1992 *Les mots, les concepts et les choses. La sémantique de Guillaume d'Occam et le nominalisme d'aujourd'hui*. Bellarmin, Montréal

Perler D 1992 *Der propositionale Wahrheitsbegriff im 14. Jahrhundert*. De Gruyter, Berlin

Perler D 1994 Late Medieval Ontologies of Facts. *The Monist* **77**: 149–69

Pinborg J 1972 *Logik und Semantik im Mittelalter: Ein Überblick*. Frommann-Holzboog, Stuttgart-Bad Cannstatt

Pinborg J 1975 Die Logik der Modistae. *Studia Mediewistyczne* **16**: 39–97

Read S (ed.) 1993 *Sophisms in Medieval Logic and Grammar.* Kluwer, Dordrecht

Rijk L M de 1967 *Logica modernorum. II (1): The Origin and Development of the Theory of Supposition.* Van Gorcum, Assen

Rijk L M de 1971–73 The development of *suppositio naturalis* in medieval logic. *Vivarium* **9**: 71–107; **11**: 43–79

Rijk L M de 1987 Gilbert de Poitiers: Ses vues sémantiques et métaphysiques. In: Jolivet J, Libera A de (eds.) *Gilbert de Poitiers et ses contemporains: Aux origines de la Logica modernorum.* Bibliopolis, Naples

Spade P V 1982 The semantics of terms. In: Kretzmann N, Kenny A, Pinborg P (eds.) *The Cambridge History of Later Medieval Philosophy.* Cambridge University Press, Cambridge

Spade P V 1988 The logic of the categorical: The medieval theory of descent and ascent. In: Kretzmann N (ed.) *Meaning and Inference in Medieval Philosophy: Studies in Memory of Jan Pinborg.* Kluwer, Dordrecht

Tachau K H 1987 *Vision and Certitude in the Age of Ockham.* Brill, Leiden

Tweedale M M 1988 Logic: From the late eleventh century to the time of Abelard. In: Dronke P (ed.) *A History of Twelfth Century Western Philosophy.* Cambridge University Press, Cambridge

SECTION VII

Renaissance — Europe

SECTION VII

Renaissance — Europe

Renaissance Linguistics: An Overview

W. Keith Percival

The Renaissance was an intellectual movement extending over several centuries which sought to assimilate the whole of Europe's ancient heritage. The veneration for the achievements of antiquity resulted in an extensive and irreversible enlargement of perspectives in all spheres of intellectual life. This emulation of ancient models is perhaps better known now than the intellectual fermentation associated with it. While Renaissance architects like Brunelleschi who designed buildings in the style of Ancient Rome and Renaissance poets from Petrarch to Milton who composed in the meters and style of the Latin writers are well known, there is a tendency to overlook Renaissance thinkers like Marsilio Ficino (1433–99), who added to the existing canon ancient philosophers, like Plato, whose works had been largely unknown hitherto. 'Renaissance linguistics,' if the term may be coined, represents an analogous expansion of horizons, both in the number of languages studied and the theoretical frameworks utilized.

The literary facet of the Renaissance is usually called 'humanism' and its practitioners 'humanists.' The intensive study of Roman authors began in several smaller northern Italian cities in the thirteenth century, gathered increasing momentum in the fourteenth century, spread in the fifteenth century to neighboring Spain, France, and Germany, and by the sixteenth century had embraced the whole of western Europe. The resulting emphasis on Latin literature strained traditional pedagogy by making it a desirable goal to know enough Latin to enable one to compose in the language as well as the Ancients had done. In this way, standards of linguistic competence were raised to hitherto unknown levels.

As for the attitude of the early humanists to the immediate past, one can say that they ignored rather than rejected the Aristotelianized grammar of the High Middle Ages and the modistic treatises of that period. They did not, in fact, discard all features of medieval grammar. For instance, they continued to use many syntactic concepts which had come into vogue in the previous three hundred years, such as 'agent,' 'patient,' and 'antecedent.' Thus, contrary to a common misconception, the humanistic grammatical writing of the fifteenth century was no mere nostalgic return to ancient models coupled with a blanket rejection of medieval grammar. The grammatical tradition had been rich and variegated in medieval Italy, and much of this long-standing grammatical practice survived more or less intact into the fifteenth century and beyond.

In any case, a conscious antithesis between medieval scholasticism and Renaissance humanism was slow to develop, and this was especially true of basic approaches to grammatical analysis. The early Renaissance humanists, notably Petrarch (1304–74) and Coluccio Salutati (1331–1406), despite their disdain for many aspects of scholasticism, were content to use the grammatical literature available in their day, much of which had been produced only recently. What was novel was their determination to restrict grammar to its original propaedeutic function as the most basic of the liberal arts, the gateway to knowledge, and the indispensable tool for the study of the revered classical authors. The link between logic and grammar, together with the connection with philosophical speculation, was accordingly dissolved; grammar resumed its original lowly status as the humble foundation stone in the edifice of belleslettres.

But grammar had developed considerably in the previous three centuries of scholasticism; the humanists could not have put back the clock even if they had wished to do so. In any case, their ambitions were extremely exacting, for what they attempted to do was to acquire not merely superficial grammatical correctness but also something of the genuine style of the Roman writers of the classical period, a quality which they referred to as *elegantia*. Accordingly, stylistic precepts and rhetorical considerations begin to play as important a role as grammatical rules. An early example is the treatise *De compositione* (1420) by Gasparino

Barzizza (1360–1430), which deals with such topics as word order and choice of vocabulary.

The most successful of the stylistic manuals written by the humanists was the massive *Elegantiae linguae Latinae* of Lorenzo Valla (1407–57), completed in the mid-1440s. This famous work, countless printed editions of which were destined to appear, is lexicographical and phraseological in character: it is chiefly a collection of words, locutions, and syntactic constructions, backed up by examples from the classical authors. Valla presents no systematic grammatical apparatus and no system of syntactic analysis, confining his attention to those aspects of style which can be discussed in connection with isolated words.

In this way, in matters of grammatical doctrine the fifteenth-century humanists were not especially innovative. The seminal work was the *Regulae grammaticales* by the humanist educator Guarino Veronese (1370–1460), which was in circulation by 1418. It deviates from the average fourteenth-century grammar only in dispensing with dialectical subtleties and in being concisely formulated. Guarino aimed to provide just enough material to enable his students to read and write Latin correctly. The *Regulae grammaticales* comprises a tightly organized syntax in the style of Guarino's fourteenth-century predecessors and a series of short chapters on a variety of topics (irregular noun inflection, comparatives, relative pronouns, syntactic figures, etc.).

In the second half of the fifteenth century, humanists began to move away from the sketchy grammars of Guarino and others. Thus, in 1468 Niccolò Perotti (1429–80) composed a manual entitled *Rudimenta grammatices*, which was printed in 1473 by Rome's first printing press. Although this work was not especially original (the central syntactic section, for example, is an expansion of the corresponding portion of Guarino's *Regulae grammaticales*), it starts out with a morphology and concludes with a treatise on epistolary style. From this novel combination of parts Perotti in effect produced the first comprehensive grammar and stylistics of Latin, and its success is attested by the scores of editions which appeared both in Italy and elsewhere in the late fifteenth and early sixteenth centuries.

More ambitious still was the *Introductiones Latinae* by the Spanish humanist Antonio de Nebrija (1444–1522), the first printed edition of which appeared in Salamanca in 1481. Nebrija's grammar, which remained in use longer than any other Latin grammar written in the fifteenth century, covers elementary morphology, syntax, orthography, metrics, and also contains an orthographical dictionary. From 1495 on, editions also include a copious commentary by the author, in which Nebrija painstakingly explains the material covered in the grammar. This is a far cry from the sparse *Regulae grammaticales* of Guarino Veronese.

Serious lexicographical work also began in the fifteenth century. Niccolò Perotti, for example, wrote a voluminous commentary on Martial's epigrams, entitled *Cornucopiae* (it appeared posthumously in 1489), which was in effect a vast treasure-house of Latin vocabulary. Nebrija also contributed to Latin lexicography by publishing a Latin–Spanish dictionary and a Spanish–Latin dictionary. In the sixteenth century, important new Latin lexica were compiled by Ambrogio Calepino (Reggio 1502) and Robert Estienne (Paris 1531). The latter's *Latinae linguae thesaurus* continued in use well beyond the Renaissance.

Overt hostility to medieval grammar became more pronounced from the mid-fifteenth century on. While Guarino Veronese did not explicitly refer to his medieval predecessors, Lorenzo Valla forcefully attacked both the medieval lexicographers and the modistic grammarians, and wrote a treatise correcting mistakes in the *Doctrinale*, a popular metrical grammar written about 1200 by Alexandre de Villedieu. Valla's main charge against the lexicographers and the Modistae was that they were purveyors of corrupt Latinity and hence impostors. A more concentrated attack on the *Doctrinale* was made by Giovanni Sulpizio in the 1470s. Sulpizio argued that that work was too obscure and confusing to be an effective pedagogical tool. Alexander Hegius (d.1498), on the other hand, aimed his fire at the modistic grammarians in his *Invectiva contra modos significandi*, composed in 1486 and published in his *Dialogi* (Deventer 1503). Again, Jan Despauter in the Low Countries wrote a whole series of textbooks in the early years of the sixteenth century which were aimed at supplanting the *Doctrinale*, although his criticisms of Alexandre de Villedieu were more moderate in tone than those of his immediate humanist predecessors.

By the middle of the fifteenth century a new element had entered the grammatical tradition, namely first-hand acquaintance with the whole corpus of Roman grammatical literature. Medieval grammarians had been familiar with only Donatus and Priscian. From the early years of the fifteenth century on, as humanists discovered more and more manuscripts of Roman authors, the number of available ancient grammatical works increased. At the Council of Constance, for instance, Poggio Bracciolini discovered two complete manuscripts of Quintilian's *Ars oratoria*, a work which introduced the humanists to the state of grammatical knowledge and speculation in the first century AD. By the 1460s, most of the Roman grammatical literature known today had been unearthed. Not surprisingly, this newly discovered grammatical literature influenced the style of grammatical writing. In revealing that the Romans themselves had disagreed on important issues of grammatical doctrine these works also stimulated a re-evaluation of traditional grammar. Thus, Giulio Pomponio Leto (1428–98), who made a careful study of Varro's *De lingua Latina* and published the first printed edition of that work in 1471, adopted Varro's theory of tenses, analyzing *amavero* 'I shall have loved' as a future perfect indicative, rather than a future subjunctive, as had been customary hitherto.

Fundamental criticism of the grammatical tradition appears first in Lorenzo Valla's *Elegantiae linguae Latinae* in the mid-fifteenth century and becomes more marked in the sixteenth century. The most influential work in this vein was the *De causis linguae Latinae* by Julius Caesar Scaliger (1484–1558), first published in Lyons in 1540. Scaliger censures the wrongheadedness of the terminology and definitions used hitherto by grammarians. Earlier in the sixteenth century, the English humanist Thomas Linacre (d.1524) wrote a more modest theoretical treatise (*De emendata structura Latini sermonis*, London 1524) which was also influential, especially on the Continent. Linacre's syntactic theory included a heavy reliance on the notion of ellipsis, which had been a popular device in the Middle Ages, and it was wholeheartedly embraced by the Spanish humanist Francisco Sánchez de las Brozas (1523–1601) in a textbook entitled *Minerva* (Salamanca 1587), which was to enjoy a considerable vogue outside Spain after it was republished in Holland in the mid-seventeenth century.

Petrus Ramus (1515–72) attempted an impressive-sounding pedagogical reform in France from the 1540s, and wrote a set of grammatical textbooks, including grammars of Latin and Greek, and a theoretical work entitled *Scholae grammaticae* (Paris 1559), which also influenced Francisco Sánchez. Another comprehensive manual of Latin grammar which contained commentaries of a theoretical character was written by the Portuguese Jesuit Manuel Alvares (*De institutione grammatica*, Lisbon 1572, and many subsequent editions).

The revival of classical learning attempted by the humanists ipso facto encouraged the use of Latin for all purposes. However, scholars in the West were also led for the first time to take up the serious study of Greek. The study of the language was inaugurated when Manuel Chrysoloras (d.1415) began to teach in Florence in February 1397. The textbook which he wrote for his Italian pupils, the *Erōtēmata*, was the first Greek grammar widely used in Italy. Chrysoloras's pupil Guarino Veronese made an abridgment of it for the use of his students and translated it into Latin. In his grammar, Chrysoloras simplified the uneconomical presentation of Greek morphology customary in the grammars used in the Byzantine East.

The fifteenth century then saw the progressive development of Greek studies in Italy. By the end of the century several grammars had been written and published in printed editions: the *Eisagogé* of Theodorus Gaza (died ca.1475), for instance, included sections on syntax and metrics. The grammar of Constantine Lascaris appeared regularly in a bilingual Greek–Latin version; it also contained a syntax. However, in spite of competition, Chrysoloras's *Erōtēmata* remained the most popular Greek grammar in Renaissance Italy. A pioneering contribution to Greek lexicography was the *Thesaurus Graecae linguae* (Geneva 1572) by Henri Estienne (1528–98), widely used as a reference work until the nineteenth century.

Together with these contemporary works some of the older Greek grammatical literature also became available, such as the grammar of Manuel Moschopulus (thirteenth century) and the *Syntax* of Apollonius Dyscolus, a copy of which was brought to Italy by Giovanni Aurispa from a trip to the Byzantine East in 1423. This was probably the first grammatical work of Greek antiquity to reach the West; it was subsequently published by the famous Venetian printer Aldo Manuzio together with the grammar of Theodorus Gaza in 1495. The now famous *Technē grammatikē* attributed to Dionysius Thrax was unknown in the West during the Renaissance.

Knowledge of Greek in the West never equalled that of Latin. The majority of scholars did not know the language well enough to read it with ease and made their acquaintance with Greek literature and philosophy from translations. Many of the foremost Greek scholars of the Renaissance, both Greeks and Westerners, spent their energies translating Greek literature into Latin. Important new translations of Aristotle's works, for example, were done in the fifteenth century.

All over western Europe, the slow rise of the vernaculars, which had already begun in the Middle Ages, continued in the fifteenth and sixteenth centuries. In Italy, the vernacular had been used for literary purposes in the fourteenth century by the great triad Dante, Boccaccio, and Petrarch. In the fifteenth century, there followed the sonnets of Lorenzo de' Medici, Luigi Pulci's *Morgante*, and Angelo Poliziano's *Stanze per la giostra*. The first Italian to use the vernacular for scholarly purposes was Leon Battista Alberti (1404–72). In the 1440s, he composed the two treatises *Della tranquillità dell'animo* ('On the tranquillity of the soul'), and *Della famiglia* ('On the family'), and defended the use of the vernacular in the prefaces to those works. Moreover, about 1450 Alberti wrote a grammatical sketch of Italian, which he left unpublished. This work did not become widely known to scholars until it was discovered in the late nineteenth century.

It may seem strange to us that in defending the use of the vernacular Alberti did not argue that Italian was a living language and therefore more natural to use than a dead language such as Latin, but instead that the vernacular is a more universal medium of communication than Latin in not being confined to the learned. He insisted, furthermore, that the vernacular is capable of being as expressive as Latin, a fact which he said was demonstrated by the achievement of the great Italian writers of the fourteenth century. Hence, it was to a large extent the prior *literary* use of the vernacular that made it worthy to be used for scholarly purposes on an equal footing with Latin.

An interesting problem arose in the case of the rise of Italian which was caused by the fact that there was no dominant political power which could impose the use of one particular Italian dialect on the whole peninsula. Italian scholars tried to solve the problem of the choice of a standard dialect by the use of abstract arguments. Three different solutions were suggested: first, the variety of Italian which had been used by Dante, Boccaccio, and Petrarch, which was a Tuscan dialect; second, the contemporary spoken dialect of Florence and Tuscany, which already differed appreciably from the language of the great fourteenth-century writers; and third, a pan-Italian 'courtly' variety of the language, a common denominator of the speech of the upper classes all over Italy.

Pietro Bembo, a Venetian, defended the use of the archaic Tuscan language of the Italian classics in a dialog composed in the early years of the sixteenth century and published in 1525. The contemporary dialect of Tuscany was championed, not surprisingly, by a number of scholars from that area, notably Machiavelli and the members of the Florentine Academy. The idea of a 'courtly' dialect was vigorously promoted by Giangiorgio Trissino and also by Baldassare Castiglione, the author of *Il cortigiano*. Bembo's solution eventually triumphed after it had been adopted by Leonardo Salviati in his influential *Avvertimenti* (1584–86) and also by the Accademia della Crusca in its Italian dictionary, published in the early years of the seventeenth century.

The first grammar of Spanish to appear in print was the work of the Salamanca humanist Antonio de Nebrija and was published in 1492. In Spain, after the political unification of the Iberian peninsula under Ferdinand and Isabella, the choice of a literary dialect caused none of the problems which were to occur in Italy. The first Portuguese grammar was written by Fernão de Oliveira and appeared in Lisbon in 1536.

In the case of French, a grammatical tradition had developed in England in the late Middle Ages, exemplified by the *Donait françois* (1409), which was commissioned by John Barton. Some of the French grammars which appeared in the early sixteenth century were also written by Englishmen, e.g., Alexander Barcley (1521) and John Palsgrave (1530). Palsgrave's grammar is especially comprehensive. The first French grammar to appear in France was written by Jacques Dubois; it was in Latin and was entitled *In linguam Gallicam isagoge* (Paris 1531).

The descriptive framework used in these vernacular grammars was, not surprisingly, the traditional Latin one. This is particularly obvious in the case of Nebrija's Castilian grammar, which bears a strong textual affinity to the same author's Latin grammar. It is also significant that a great deal of attention is devoted in these early vernacular grammars to orthographic questions. The ideal was to achieve a consistent spelling system with a separate symbol for each sound. Nebrija proposed such a system in a treatise published in 1517 (*Orthographia del castellano*), in which the basic theoretical notions were the same as those that he had expounded earlier in a treatise on the pronunciation of Latin and Greek (*De vi ac potestate litterarum*, Salamanca 1503). In France, the cause of orthographical reform was espoused by Louis Meigret (*Le tretté de la grammere françoeze* 1550) and somewhat later by Petrus Ramus (*Gramere* 1562). It cannot be said that any of these reforms had much practical success.

In the sixteenth century, the linguistic horizon of western Europe was broadened in other ways. First, the voyages of discovery and the ensuing commercial and colonial enterprises of the Portuguese and the Spanish (and later the Dutch, French, and English) brought Europeans into contact for the first time with the languages of the Levant, Africa, India, the Far East, and the New World. Second, the study of Hebrew (and later Aramaic and Arabic) introduced scholars to a radically different grammatical framework: the first full-scale grammar of Hebrew to appear in the West appeared in Pforzheim in 1506, written in Latin by Johann Reuchlin (1455–1522). These twin factors had the effect of putting an end to the linguistic isolation of western Europe.

The results of these widening perspectives were complex. Since no generally agreed-on methodology existed for conducting linguistic research, the work done on the newly discovered exotic languages sometimes bore an amateurish stamp. The aim was, at least, clear: missionary-linguists needed to produce practical grammars which could be used in the task of converting the natives to Christianity. At the same time, they were led to face the problem of accounting for the extraordinary linguistic diversity with which they were confronted, and penetrating the process whereby so many different languages had arisen. Their curiosity was mainly stimulated by vocabulary, and the conceptual tool used to approach the problem was the etymological theory that the West had inherited, ultimately, from the Stoics (see *Aristotle and the Stoics on Language*). There was also a further factor: the Biblical account of the building of the Tower of Babel seemed to imply that Hebrew was the original language of mankind and that all other languages were distortions of this primitive Hebrew. The story of the Flood gave rise to the notion that the languages of Noah's progeny were related to each other in the same way as his descendants. By the first half of the sixteenth century scholars had been made aware for the first time of the close affinity between Hebrew and Arabic. In this way, the genealogical notion of language relationship began to be taken more seriously. Scholars, therefore, imagined that they could make lexical comparisons between Hebrew and the languages spoken in the world in their own day and use them to arrive at the origins of words and discover the genealogy of the languages themselves.

The notion that there were several parent languages each of which in the course of time gave rise to a group of related languages was clearly expressed in a brief essay on the genetic affiliations of the languages of Europe (*Diatriba de Europaeorum linguis*) by Joseph Scaliger (1540–1609), written in 1599 and published in 1610. However, there were at this time no criteria for determining which words in a language had been inherited from its parent language and which had been borrowed from other sources. The most daring etymological theorist of the period, Johannes Goropius Becanus (*Origines Antwerpianae*, Antwerp 1569) indulged in the fantasy of deriving all languages from his native Dutch, but in so doing he launched the idea that the languages of Europe are later divergent continuations of the language of the ancient Scythians, an Iranian tribe living on the steppes of southern Russia in antiquity. His etymologies were greeted with incredulity by contemporaries, but his example set a trend.

Other important works on language relationships which appeared in the sixteenth century were Guillaume Postel's *De originibus* (Paris 1538), Theodore Bibliander's *De ratione communi omnium linguarum* (Zurich 1548), and Conrad Gesner's *Mithridates* (Zurich 1555). Postel explicitly claims that Hebrew was the first language of mankind, that Arabic, Aramaic, and Ethiopic were corrupt forms of Hebrew, and that even Greek had adopted many expressions and turns of phrase from it. He also endorses the Biblical account of the sons and descendants of Noah as a basis for drawing inferences about the early relationships of languages and peoples. It is noteworthy that he defends the extreme naturalist position presented in Plato's *Cratylus*, exemplifying in this way the increasing influence of that dialog on the philosophy of language in the sixteenth century after its translation in the late fifteenth century by Marsilio Ficino. Postel also represents the crude beginnings of language typology: he contrasts the 'grammatical' languages (Latin and Greek) with what he calls the 'natural' languages (Hebrew and the other Semitic languages). Inflections, he claims, were borrowed into Latin and Greek from the latter languages. As fanciful as these ideas undoubtedly are, they testify to the powerful impact of the study of Hebrew on the general linguistic ideas of the time.

The main thesis of Bibliander's *De ratione communi* is that there is no language which cannot be described grammatically. Bibliander is remarkable in that he was not only familiar with Hebrew but also with one of the Slavic languages, namely Polish, and emphasizes the fact that such languages are as grammatically organized as Latin and Greek. Like Postel, he is scornful of suggestions that some languages have no grammatical rules at all. Significantly, it was to a large degree the *grammatical* similarity of Hebrew to Arabic and Ethiopic which was used to demonstrate that they are related (*affines*) to one another. Conrad Gesner's *Mithridates* (1555), a less ambitious book than Bibliander's, was an attempt to survey all known languages in the world and included specimens of many of them in the form of the Lord's Prayer.

Grammars of non-European languages began to be written soon after missionaries arrived in large numbers in the New World in the third decade of the sixteenth century. The earliest grammar of a Native American language to appear in print was Maturino Gilberti's *Arte de la lengua de Michuacan* (Mexico City 1558). The most notable of them were the *Arte de la lengua mexicana y castellana* by Alonso de Molina (Mexico City 1571) and the Quechua grammar by Domingo de Santo Tomás (Valladolid 1560). These were all the work of members of the mendicant orders or the Society of Jesus. Not surprisingly, the framework used in them was the familiar Latin one (indeed, Nebrija's *Introductiones Latinae* was the model most often referred to in these grammars). However, the Latin framework had the advantage of being familiar to all churchmen. Moreover, a conscientious investigator who spent most of a lifetime in the field could achieve comprehensive coverage. But since most grammars of exotic languages were published outside Europe for local consumption, it was difficult for a coherent tradition of grammatical expertise to develop. There is evidence, however, that grammarians did not start out from scratch, but were given special training and familiarity with the work of people who had studied the same or similar languages previously.

Bibliography

Ferguson W K 1948 *The Renaissance in Historical Thought: Five Centuries of Interpretation*. Houghton Mifflin, Cambridge, Massachusetts

Padley G A 1976 *Grammatical Theory in Western Europe 1500–1700: The Latin Tradition*. Cambridge University Press, Cambridge

Padley G A 1985 *Grammatical Theory in Western Europe 1500–1700: Trends in Vernacular Grammar*, 2 vols. Cambridge University Press, Cambridge

Percival W K 1975 The grammatical tradition and the rise of the vernaculars. In: Sebeok T A (ed.) *Current Trends in Linguistics. Vol. 13: Historiography of Linguistics*. Mouton, The Hague

Rowe J H 1974 Sixteenth and seventeenth-century grammars. In: Hymes D (ed.) *Studies in the History of Linguistics: Traditions and Paradigms*. Indiana University Press, Bloomington, Indiana

Renaissance Linguistics in Italy

Brian Richardson

Interest in language during the Renaissance in Italy was probably stronger than at any time in the ancient or medieval past, to judge by the quantity of writings devoted to it. This interest was stimulated by the cultural and political conditions of the age, but was also strongly governed and in some ways limited by them. In spite of these constraints, considerable advances were made in areas such as the understanding of the ancestry of Italian, phonetic analysis, and the establishment of the grammar and lexicography of the vernacular.

1. Cultural and Political Background

Educated Italians had two written languages at their disposal. The vernacular had already been well established as a literary language alongside Latin by three great authors of the late thirteenth and fourteenth centuries, Dante Alighieri (1265–1321), Francesco Petrarca (Petrarch) (1304–74), and Giovanni Boccaccio (1313–75), all from Florentine families. But the rise of humanism, to which the study of classical Latin and to a lesser extent Greek was central, meant that Latin retained great prestige and was esteemed by some as worthier than the vernacular. The latter continued to be cultivated by writers in the fifteenth century, particularly during its last quarter. However, the Italian written vernacular did not develop in the same way as in nation states such as England or France. Italy was disunited, a patchwork of states which were often mutual rivals and some of which came under French or Spanish domination after 1494. There was no political capital, therefore, to provide spoken and written linguistic unity. Nevertheless, there was a natural tendency towards some degree of uniformity throughout the peninsula: Italians still belonged to a cultural community. Standardization was encouraged by a practical motive—the growth of the printing industry, centered in Venice, and the consequent search for a wider readership—as well as by the triumph of the doctrine (expounded most notably by the Venetian nobleman Pietro Bembo (1470–1547), and dominant by the 1530s) that, if the vernacular was to be a worthy alternative to Latin, it had to be treated with the same seriousness: one should therefore imitate the language of the best authors alone, and this meant the Florentine of Petrarch and to a lesser extent Dante for poetry, that of Boccaccio for prose. This difficult process was accompanied by debates (known as the *questione della lingua* 'the language question') over the rival claims of Latin and the vernacular; over the extent to which written use of the vernacular could be influenced by non-Tuscan varieties, or by contemporary Tuscan, or by the spelling and syntax of Latin itself; and hence over the name to be given to the literary language (e.g., Italian, Tuscan, Florentine, or just the *volgare*). These debates were made all the more acrimonious by the strong challenge which was made to the cultural leadership of Florence, particularly after the death of Lorenzo de' Medici in 1492.

Given this background, interest in language was naturally strong; but it was also partisan. It was often conditioned by the writer's place of origin and by his views on the status of the literary vernacular and on its name and nature. It also tended to focus on the literary rather than the spoken language (as indeed had been the case with grammars of classical languages from the Alexandrian school up to the Middle Ages).

2. Diachronic and Comparative Linguistics

2.1 The Relationship of Latin and Greek

It was widely believed in the fifteenth century that Latin derived from Greek: the classical myth of the transference of 'letters' from ancient Greece to Rome was taken to refer not just to the alphabet but also to language itself (Aeolic, or Attic, or generically Greek). An isolated opponent of this idea was the Sienese theologian Bartolomeo Benvoglienti (d.1486). More influenced by the myth of the Tower of Babel than by humanistic ideas, he held that the language of the ancient Romans had not been brought from Greece but was a sister language indigenous to Italy. There was still uncertainty in the sixteenth century. Bembo wrote in his *Prose della volgar lingua* (1525, I: 6) that Latin came from Greek; but Lodovico Castelvetro (ca.1505–71), of Modena, used the Babel myth in order to criticize this view in his *Giunte* to the *Prose* (written 1549–63).

2.2 The Vernacular: Ancestry and Change

Debates in the early part of the period on the language or languages used in ancient Rome formed the basis of the study of the development of the vernacular. In the first half of the fifteenth century some were still influenced by the medieval view (seen for instance in Dante's *De vulgari eloquentia*) that there was a necessary distinction between a literary language governed by 'art' and an unregulated vernacular which was a product of 'nature.' In a discussion which took place in Florence in 1435, Leonardo Bruni (ca.1370–1444), a Tuscan, supported the idea that the Roman 'unlettered' had spoken a *sermo vulgaris*, distinct from *sermo litteratus* in the same way as the contemporary vernacular was distinct from Latin. (Bruni did not identify the *sermo vulgaris* with the vernacular, however, nor did he despise the latter, which he believed had a right to its own separate existence.) Flavio Biondo of Forlì (1392–1463) argued, though, that Latin had been the language used by all levels of society, albeit with differences according to the cultural levels of speakers. Writing about 15 years later, Poggio Bracciolini (1380–1459) suggested that the variety of spoken Latin had been due to the movement into Rome of neighboring peoples who spoke different languages.

Biondo attributed the evolution of Latin into the vernacular to the influence of the Germanic invasions. He was no supporter of the vernacular and for him this change was a process of corruption. But the Florentine Leon Battista Alberti (1404–72), while still talking of the process of corruption by which Latin evolved into the vernacular, used Biondo's argument to support the younger language: if the ancient Romans had chosen to write in a language which was that of all society, not just of an elite, then his contemporaries should likewise use the vernacular in order to reach a wider audience (proem added to *Della famiglia*, Book III, in 1437).

The Latin–vernacular relationship was often analyzed in the sixteenth century with terms from the natural world. In Pierio Valeriano's *Dialogo della volgar lingua* (after 1524), Gian Giorgio Trissino (1478–1550) describes the Italian vernacular as the daughter of Latin, while Spanish is merely Latin which has grown old. From the 1530s onwards the idea of 'corruption' was developed, particularly by Claudio Tolomei (ca.1492–1556), Girolamo Muzio (1496–1576), and Benedetto Varchi (1503–65), in a way that would favor the vernacular, with recourse to the Aristotelian distinction between corruption leading merely to *alteratio* (a change of accidents not substance) and that leading to the *generatio* of a new substance, in this case the vernacular. The contrast between 'dead' languages (such as Latin) and 'living' ones was made in 1540 by Alessandro Citolini (ca.1500–ca.1583), who may have derived it from Tolomei, the central figure in the 'Sienese school.' Tolomei made the important distinction (described in his *Cesano*, printed 1555 but composed probably in the 1530s) between an uninterrupted tradition from Latin to the vernacular and the later borrowing of learned words, leading to doublets such as *pieve* and *plebe*.

Castelvetro developed these ideas into a concept similar to that of 'vulgar Latin.' Continuing his attack on Bembo's *Prose*, he argued that there had been a continuity between a low form of spoken Latin and the vernacular. The modern *lingua vulgare*, he wrote, was not used in the same form in republican Rome, but, if one ignores changes in gender, inflection, etc., such a language (for which evidence is found in comedies and in writers like Apuleius) was used among the uneducated. Castelvetro also studied the social and psychological reasons which led to the gradual spread of this language during the late Empire and the barbarian invasions. He attributed regional differences in the vernacular to a variety of reasons: in the north of Italy, to the colder climate (which meant that Latin was pronounced more imperfectly there than in Tuscany) and to exchanges of words with peoples beyond the Alps; in the south, to a preference for speaking Greek.

Castelvetro was an outstanding student of etymology and of historical grammar, analyzing for instance the formation of the future tense and of the conditional mood in Italian and recognizing the importance of analogy in the evolution of verb forms.

Relationships between the vernacular and ancient languages other than Latin were also explored, often for the purpose of ennobling the ancestry of the modern language. The idea of a continuity between the lexicon of Etruscan and of Tuscan was expressed by Niccolò della Luna (1410–after 1450) and was developed, with varying degrees of caution, by Tuscans in the sixteenth century. Tolomei (in the *Cesano*) estimated that over two-thirds of Tuscan words came from Latin, but that lesser contributions came from Etruscan and the Germanic languages; however, he recognized that Etruscan words had become part of Latin first. A Florentine, Pier Francesco Giambullari (1495–1555), used the forgeries of Giovanni Nanni of Viterbo (1432?–1502) (published under his Latinized name of Annius in 1498) in order to expound in the 1540s (and hence in the climate of cultural nationalism of Cosimo de' Medici's state) the theory that, after the Flood, Noah had brought Aramaic to Etruria. Aramaic was thus the source of Etruscan, which was older than Greek, and which in turn became the core of Tuscan (*Il Gello*, 1546).

Evidence for a Greek lexical and even morphological substratum was also investigated. Benvoglienti gave a list of words which could be derived from Greek and compared the definite articles in Greek and the vernacular. Raffaele Maffei, in a work printed in 1506, also produced evidence that Greek had left its legacy in the lexicon of the vernacular. According to Valeriano, Trissino believed that, while Latin was the mother of the vernacular, the Greek of the 'Grecianized Romans' who migrated from Constantinople after the Lombards had been driven out of Italy was its foster mother and the source of its definite articles.

Two later contributions to this debate came from Ascanio Persio (1554–1610) in his *Discorso intorno alla conformità della lingua italiana con le più nobili antiche lingue e principalmente con la greca* (1592) and Angelo Monosini in his *Floris italicae linguae libri* (1604). Persio, from Matera in the Basilicata, was able to distinguish between Greek words which had come through Christian Latin and those which came from the living Greek still used in the south. His title suggests knowledge of Henri Estienne's (ca.1531–98)

Traicté de la conformité du langage françois avec le grec (1565; see *Renaissance Linguistics in France*); however, while the Frenchman was arguing for a direct link with ancient Greek, Persio (like Monosini) acknowledged that Latin was the main source of 'our Italian language.'

Filippo Sassetti (1540–88), a scholar turned merchant, noted during his travels in India some similarities between words in Sanskrit and Italian; but his observations were not taken further.

The Florentine Vincenzio Borghini (1515–80) made brief but perceptive contributions to the study of linguistic history, many of which he unfortunately left unpolished and unpublished: for example, essays on why languages change, on how and why loan words enter languages, and on the causes of semantic change (which he gave as changes in the thing designated, a tendency to move from general to narrower meanings, and changes in customs).

3. Spelling Systems and Phonetic Analysis

Two of the principal factors which led to proposals to modify spelling were the movement to establish the autonomy and dignity of the vernacular and its literature alongside Latin, and the desire to support one variety of the vernacular against others. Discussions of orthography could lead in turn to the analysis of the sounds of Tuscan and of other contrasting pronunciations. Experimentation with new spelling systems began, in one exceptional case, in the manuscript age, but it was particularly associated in Italy with the introduction of printing and with varieties of italic type, a new style first used for a complete book in 1501.

Such new spelling systems shared the aim of helping readers to understand the written language more easily, avoiding confusion between words which would otherwise be written in the same way. They could also give some help with pronunciation, at least by indicating some stresses and in a few cases by marking open and closed *e* and *o* or voiced and voiceless *z* (whose distribution varies regionally). A variety of strategies were used separately or in combination: (a) assigning existing variant letter forms to different sounds (e.g., *i* for the vowel but *j* for the semi-consonant [j], *u* for the vowel but *v* for the consonant, *z* for [ts] but *ç* for [dz]; (b) using diacritics such as grave, acute, or occasionally circumflex accents on vowels; (c) borrowing characters from the Greek alphabet; (d) replacing etymological spellings (e.g., preferring *i* to *y* and *f* to *ph*, so that there was one symbol for one sound, or using *-tt-*, which reflected pronunciation, rather than *-ct-* or *-pt-*).

The first two of these resources were used by Alberti in his manuscript grammar of 1437–41 (see Sect. 4), and again, in print this time, in the 1540s by Tolomei and Giambullari. The first three were used by Trissino in his printed alphabets of 1524 and 1529; his use of epsilon and omega (to be linked with his personal enthusiasm for Greek culture; see Sect. 2.2) aroused particular hostility for many years thereafter. However, only two reforms were to have lasting effect. One was the introduction of accents to distinguish between certain monosyllables (e.g., *è* 'is' versus *e* 'and') and to mark oxytone words (e.g., *andò*) and the use of the apostrophe to indicate the loss of a vowel where two words came into contact. This began, in print, with a Petrarch printed by Aldo Manuzio (ca.1450–1515) and edited by Bembo in 1501, and was then extended by other printers and editors. The other reform was the gradual elimination (by authors, printers, and their editors) of most Latinizing spellings in the course of the sixteenth century. This was favored by the return towards prehumanistic, fourteenth-century literary models, and guidance in this direction was first given in Fortunio's *Regole* (see Sect. 4).

Since the linguistic interests of Italians were predominantly in the written language, it is not surprising that by far the best description of the articulation of Tuscan should have come in a work by a foreigner, the *De italica pronunciatione et orthographia* (1569) of the Welsh doctor Siôn Dafydd Rhys (1534–ca.1609). Other major contributions included the published and unpublished works of Tolomei (such as *Il Polito*, 1525, an excellent analysis of the relationship between spelling and speech, with a good understanding of the primacy of speech and of the social dimensions of the problem), and the descriptions of articulation in the *Elementi del parlar toscano* of Giorgio Bartoli (d. 1583).

4. Grammar

In the study of Latin grammar, some innovations appear in the *Regulae* of Guarino Veronese (1374–1460), written before 1418, which dispensed with such concepts of the medieval *modistae* as the *suppositum* (subject) and *appositum* (predicate), and *transitio* and *intransitio* (respectively, the relation between verb and object and between verb and subject). Lorenzo Valla's (ca.1407–57) *Elegantiae* (finished in 1449) re-examined in detail the morphological, syntactic, and lexical distinctions offered by Latin. A number of humanist grammars written in the second half of the century based themselves on grammars of the fourth and fifth centuries (Donatus and Priscian) rather than on medieval sources.

Grammarians of the vernacular naturally took Latin grammar as their blueprint. One of the purposes of the first grammar, written by Alberti as early as 1437–41, was precisely to show that Tuscan could be analyzed with the same criteria as Latin. However, the use of a Latin-based framework made it difficult to deal with innovations of the vernacular such as definite and indefinite articles, the conditional mood, the loss of the neuter gender, and of distinctive case endings. There was much debate over the status of the 'signs of case' (e.g., *a*, *di*, *da* and compounds like *al*, *del*, *dal*).

Another potential problem was that of the type of vernacular to be analyzed. Alberti wrote before the rise of imitation of the fourteenth-century literary tradition and he therefore chose contemporary spoken Florentine usage. But his precocious grammar found no imitators. Grammars written by non-Tuscans in the sixteenth century codified the usage of the great Tuscan authors of the fourteenth century and were intended to help readers to model their own writings on them. Thus the *Regole grammaticali della volgar lingua* (1516) of Giovan Francesco Fortunio (ca.1470–1517), of Pordenone, provided a guide, based on Dante, Petrarch, and Boccaccio, to morphology and spelling, the areas in which non-Tuscans needed most guidance. The third book of Bembo's *Prose*, the work which provided the most influential statement of the argument for imitation in the vernacular, included a grammar based chiefly on Petrarch and Boccaccio; the dialog form used by Bembo helped him to avoid the schematic and the technical. Later grammars, however (including recastings of Bembo's), were easier for readers to consult. That of Marco Antonio Ateneo Carlino (Naples, 1533) used as models two modern authors (Bembo himself and Jacopo Sannazaro, 1456?–1530) as well as Petrarch. The first grammar to treat syntax separately, if briefly, was that of Rinaldo Corso (1525–ca.1580; Venice, 1549). A much fuller treatment of syntax is found in Giambullari's *Regole della lingua fiorentina* (1552) and owes much to a work by an Englishman, Thomas Linacre's (1465–1524) *De emendata structura latini sermonis* (1524). Giambullari's grammar is part of a reaction on the part of Florence to the way in which non-Tuscans had appropriated what Florentines considered to be their language; the usage which he describes is based on the living usage of his cultured contemporaries, but he also takes earlier writers into account.

Bembo was the only outstanding linguistic scholar of the sixteenth century to publish a complete grammar. However, of the others, Tolomei and Vincenzio Borghini both planned to write grammars and left various sketches on grammatical topics; Castelvetro's works (mostly published posthumously) dealt with aspects of grammar, including its historical dimension (see Sect. 2.2); and Lionardo Salviati (1539–89), a Florentine, wrote at length on nouns and articles in his *Avvertimenti* on Boccaccio's *Decameron* (1584–86).

5. Lexicography

Although there were some fifteenth-century antecedents (e.g., Venetian–German and vernacular–Latin glossaries), lexicography flourished, like grammar, only from the second quarter of the sixteenth century. From then on, the purpose of dictionaries and glossaries was, as with grammars, to describe fourteenth-century literary Tuscan; another similarity was that, for a long time, their compilers came from outside Tuscany.

After some relatively unsuccessful attempts in the 1520s and 1530s—Niccolò Liburnio's (ca.1474–1557) *Tre fontane* (Venice, 1526); Lucilio Minerbi's (ca. 1490–after 1522) *Vocabolario*, printed with the *Decameron*, also in Venice, in 1535; Fabricio Luna's (d.1559) *Vocabulario di cinque mila vocabuli toschi* (Naples, 1536)—a notable improvement in lexicography was marked by works produced in the 1540s by two authors from the Ferrara area: Alberto Acarisio's (1497?–1544?) *Vocabolario, grammatica et orthographia de la lingua volgare* (1543), which is much better organized than its predecessors, explains words with definitions (in the vernacular) or synonyms (vernacular or Latin), and offers information on the register of some words; Francesco Alunno's (1484?–1556) *Le ricchezze della lingua volgare* (1543), based on Boccaccio, which was partly a dictionary, partly a concordance (the meaning of many entries is left unexplained), and (like Acarisio's dictionary) included a grammar; and Alunno's encyclopedia-cum-dictionary *La fabrica del mondo* (1546–48). Both Acarisio and Alunno showed an interest in contemporary non-Tuscan usage, and Alunno gave separate lists of foreign, dialectal, or technical words which conform with those found in his approved authors. In the *Ricchezze* Alunno noted where Italian words have cognate forms in other languages (e.g., *città* has similar forms in Latin, Spanish, French, and English), and he stressed that Boccaccio did not limit his vocabulary to Tuscan. But a strict adherence to Tuscan and to archaizing principles underlay the first Florentine dictionary, the *Vocabolario* (1612) of the Accademia della Crusca. The compilers made some methodological progress over predecessors such as Alunno by giving more emphasis to definitions rather than synonyms.

6. Translation

The first modern Italian treatise on translation was Bruni's *De recta interpretatione* (ca.1420). It arose out of his experiences in translating from Greek into Latin, but he saw its conclusions as equally valid for translations into the vernacular. The qualities which he considered essential, but which had been lacking from medieval translations, included an excellent knowledge of both languages being used, a sense of style, and the ability to imitate the characteristic style of the source text.

In the sixteenth century, discussions on translation were given new impetus by the Latin–vernacular rivalry, by new ideas about dead and living languages and comparative linguistics, and (in some cases) by Protestant sympathies and by anticlericalism. Among the general questions raised were those of whether knowledge should be vulgarized, whether translation affects the expression of concepts, and whether new words were needed in the vernacular.

Some took a liberal attitude to these problems. In Sperone Speroni's (1500–88) *Dialogo delle lingue* (Venice, 1542), the philosopher Pietro Pomponazzi says that all languages are of equal worth and that Greek philosophical works could and should be translated into the vernacular. Giovan Battista Gelli (1498–1563), in his *Capricci del bottaio*, Ragionamento V (1546), repeated Bruni's advice and urged Tuscans to translate sacred scriptures, works of learning, and even everyday legal documents, creating neologisms where necessary; this would enrich their language as well as having spiritual, educational, and practical benefits.

Others were more cautious. Castelvetro wrote (in a letter of 1543) that some concepts were so bound up with words that they were untranslatable; there was a risk of providing inappropriate 'clothes' for concepts in other languages. As for the question of neologisms, he tried to use the natural words of his own language in his translation of Aristotle's *Poetics*. Tolomei (in a letter also of 1543) approved of the principle of making works available in other languages but said that a poet inevitably lacked originality when translating another poet. Borghini, like Castelvetro, warned of the difficulties of translating concepts (because of the differences between languages, customs, etc.) and of the problems of inventing new words.

7. Nonliterary Varieties of the Vernacular

It was seen above (Sect. 2.2 and Sect. 3) that the Italian Renaissance showed a certain degree of interest in the social use of language and in spoken language. A recognition that, when one considered language in general as a means of human communication, the spoken word had primacy over the written word, spread in the sixteenth century with the reaction, particularly strong in Tuscany, against the humanistic attitude typified by Bembo's assertion (in the *Prose*, I: 14) that no language could truly exist without a writer. In practice, however, varieties of the vernacular other than the literary tended to be mentioned, if at all, only in the course of the study of the written language. Dialect or regional synonyms might, for instance, be used in Latin–vernacular dictionaries or in glossaries designed to help non-Tuscans to read works from the literary canon. In discussions on the literary vernacular, considerable use was made of the potential parallel between the linguistic situation in Italy (where Italians saw that they shared a literary language in the making but argued about whether it was Tuscan or 'common') and the five 'dialects' of ancient Greece, Attic, Ionic, Doric, Aeolic, and the '*koiné*' or common dialect. It was in this context that the term *dialetto* was introduced in the mid-sixteenth century and then used in contrast with *lingua*.

The few descriptions of dialect phonology came from outside the mainstream of vernacular culture. The humanist Paolo Pompilio (ca.1455–91) mentioned some regional pronunciations in 1488; but the first detailed (and affectionate) description of a dialect appeared only in 1606, the *Prissian da Milan della parnonzia milanesa* by G. A. Biffi.

An outstanding example of a scholar who examined nonliterary varieties of Tuscan was Borghini. He studied the language of artisans and of rustic or female speakers, as well as of nonliterary texts. But the main aim of such research was to provide authority for rare forms in the texts of fourteenth-century authors.

Bibliography

Malmberg B 1973 *La traduzione: Saggi e studi*. Lint, Trieste

Maraschio N (ed.) 1992 *Trattati di fonetica del Cinquecento*. Accademia della Crusca, Florence

Mazzocco A 1993 *Linguistic Theories in Dante and the Humanists*. Brill, Leiden

Migliorini B 1984 *The Italian Language*, 2nd edn. Faber & Faber, London

Migliorini B 1991 *Storia della lingua italiana*, 2 vols. Sansoni, Florence

Padley G A 1988 *Grammatical Theory in Western Europe 1500–1700: Trends in Vernacular Grammar*, II. Cambridge University Press, Cambridge

Ramat P, Niederehe H-J, Koerner K (eds.) 1986 *The History of Linguistics in Italy*. Benjamins, Amsterdam

Serianni L, Trifone P (eds.) 1993–94 *Storia della lingua italiana*, 3 vols. Einaudi, Turin

Tancke G 1984 *Die italienischen Wörterbücher von den Anfängen bis zum Erscheinen des 'Vocabolario degli Accademici della Crusca' (1612)*. Niemeyer, Tübingen

Tavoni M 1990 La linguistica rinascimentale: L'Europa occidentale. In: Lepschy G C (ed.) *Storia della linguistica*, vol. 2. Il Mulino, Bologna

Trabalza C 1908 *Storia della grammatica italiana*. Hoepli, Milan

Renaissance Linguistics in Spain

Juan C. Zamora

The origin of Spanish Renaissance linguistics can be traced to Italy in the 1440s, to the work of Lorenzo Valla (1407–57). His ideas, goals, and methods decisively influenced early Spanish humanism. One of Valla's goals was the recovery of Classical Latin, rescuing it from what he perceived as the clumsiness and corruption of Medieval and Church Latin. Recovery of the language of Cicero and Virgil would make possible the rediscovery of Classical learning. Valla also wanted to discredit the canon of medieval grammarians, and the scholastic philosophers who had provided the intellectual basis for medieval thought. Valla's tool to achieve both goals was philological exegesis (the use of grammar, rhetoric, and history to establish the validity of part or all of a text), which was not of his invention, but which he developed and perfected.

Humanist questioning of Medieval Latin texts presented a problem for the Church, since much of Church doctrine had resulted from readings of those texts. The Church was also troubled by humanism's rejection of scholastic philosophy, because it served as the base for medieval theology. The resulting conflict between the Church and humanism greatly affected grammatical studies during the Renaissance, to some degree everywhere in Europe, but particularly in Spain.

During the early Renaissance an interest in 'vernacular humanism' paralleled the interest in 'Classical humanism.' The concern with correct usage of Latin was transferred to the vernacular languages, and it led to the writing of both grammars and treatises on the merits and values of these languages. For Spanish, one of these treatises deserves special consideration, the *Diálogo de la Lengua* (1535; written in Naples, first published in Madrid in 1737) by Juan de Valdés (ca.1495–1541). It is an attempt to do for the Spanish language what Pietro Bembo (1470–1547) had done for Tuscan (Italian) in his *Prose della Volgar Lingua* (1525). The development of national states and the need for a unifying official language added to interest in the study of the vernaculars.

Early humanists were not interested in explanatory theories of grammar; their objective was to describe the language of the great figures of Classical antiquity, not to explain the nature of language and how it worked. Moreover, the theoretical approach to language with which they were familiar, 'speculative grammar,' had been developed within Aristotelian scholasticism, which they rejected. However, towards the end of the first half of the sixteenth century, when the goals of the humanist movement had been achieved, interest in theory again developed. As far as linguistics is concerned, the Renaissance can be divided into two major periods. The first one is dominated by descriptivism, the second one by an interest in explanatory theories of language and grammar. In Spanish Renaissance linguistics one finds the same two periods, the second one beginning toward the 1580s. Each one of these periods in Spain will be dominated by one major figure, Nebrija and Sanctius, respectively. Those topics of Spanish linguistics that overlap the above temporal division will be treated separately.

1. The Early Renaissance in Spain

Lorenzo Valla's ideas and methods spread to Spain quickly, earlier than to other parts of Europe. This is partially explained by the Spanish (Aragonese) presence in Italy. In 1440 Valla, while acting as secretary of Alfonso V of Aragón, wrote his *Declamatio de Falso Credita et Ementita Donatione Constantini*, where he first used the philological method to expose as fraudulent the document used by the Church to claim the Italian territories of the former Roman Empire. Obviously this favored Alfonso's claim to territories in Italy.

A more important factor was Antonio de Nebrija's humanistic training in Italy. In 1463, at age 19, Nebrija left the University of Salamanca to continue studying at the Spanish College in Bologna. He spent 7 years in Italy studying the ideas and methods of humanist philology. When he returned to Spain in 1470 Nebrija had become a devoted follower of Valla.

1.1 Antonio de Nebrija (1444–1522)

Antonio (also Elio Antonio) de Nebrija (or Lebrija, for his place of birth in southern Spain) dominated the early Renaissance in Spain through the volume, quality, and diversity of his work. He is the first to cover all the fields and languages of interest to early humanism. He wrote grammars of Latin (including a 1486 version in Castilian, for Queen Isabella) as well as one of Castilian. He also wrote bilingual dictionaries of Latin and Castilian, and studies on the orthography and pronunciation of Classical Latin, Greek, and Hebrew. Nebrija also wrote dictionaries of Latin legal and medical terminology, a book on history and archaeology of Spain, and other diverse works, including poetry composed in classical Latin.

Nebrija's first major work, his *Introductiones Latinae* (Salamanca 1481) appeared while he was teaching at the University of Salamanca. It was an immediate success; by the time of its author's death the book had gone through at least 50 editions or printings, in Spain and abroad. After Nebrija's death the *Introductiones* was published several times during the sixteenth century in France and Italy. An English translation of the 1486 Castilian version appeared in England in 1631. In Spain the *Introductiones* was the most popular text for teaching Latin until the eighteenth century. Its success was determined mostly by its didactic nature. Nebrija was an admirer of the Latin (Byzantine) grammarian Priscian, but he realized, and said so, that Priscian wrote for students whose first language was Latin, while he was writing for students with no knowledge of Latin when they arrived in school; the book was the first one consciously written for students of Latin as a second language.

His dictionaries, Latin–Spanish (1492), Spanish Latin (ca.1495), were models of lexicography; they represented a complete break with the medieval tradition in this kind of work. His Spanish grammar, *Gramática de la Lengua Castellana* (Salamanca 1492), was the first complete one for a modern language. It includes books (sections) on syntax and on Spanish for foreigners, in addition to the traditional sections on orthography, pronunciation, prosody, and morphology. Rather than simply adapting and translating from Latin, Nebrija in the *Gramática* develops a new grammatical terminology for Spanish.

In 1502 Nebrija joined the group set up in Alcalá by Cardinal Jiménez Cisneros to publish a polyglot Bible, but he abandoned Alcalá when Cisneros forbade changes in the Medieval Latin version. On returning to the University of Salamanca he tried to publish a list of biblical errors deriving from a poor knowledge of Latin, Greek, and Hebrew, but the Grand Inquisitor prohibited the publication and ordered Nebrija to surrender the list, which he did. Nebrija's problems with the Church and the Inquisition had no grave consequences, but only because of his friendship with the leaders of the Spanish Church, and with the Spanish monarchs Ferdinand and Isabella. Later grammarians would not find dealing with the Inquisition as easy.

Nebrija spent his last years as a professor at the University of Alcalá, which had been founded by Cardinal Cisneros. In recognition of the importance of Nebrija's scholarship and continuing productivity Cisneros said in the decree of appointment that the Spanish grammarian would draw a salary whether he taught or not.

1.2 Other Descriptive Grammars

Several grammars on Spanish were published before 1580, but only one in Spain proper, Baltasar Sotomayor's *Grammática* (1565), which compares Spanish and French to facilitate the learning of the latter. Four were published in the Spanish territories of the Low Countries, in Amberes (Antwerp), or Lovaina (Louvain), all to facilitate the learning of Spanish. Two are anonymous (1555, 1559), but the authors of the others were Gabriel Meurier (ca.1530–87) and Cristóbal Villalón (ca.1510–1562) (both of 1558). Meurier's includes French as well as Spanish, while Villalón's is the best of this whole group. Two grammars appeared in Italy during this period, those of Giovanni Mario Alessandri (1560) and Giovanni Miranda (1565). None is comparable in intent or content to Nebrija's.

Latin grammars were published by Bernabé de Busto (Salamanca 1533) and Bachiller Thámara (Antwerp 1550), both in Spanish, but only four works on the Classical languages written during this period, all by the same author, deserve any consideration, and only because the author, Francisco Sánchez de las Brozas (usually referred to in Spanish as 'el Brocense,' and in other languages as 'Sanctius') is the major figure of the second part of the Renaissance in Spain. Two of his introductory textbooks on Latin were published in Lyon in 1562; another one, written in Spanish, was published in Spain in 1576. Sanctius published an introductory Greek grammar in Antwerp in 1581. His major work, the *Minerva*, will be discussed in Sect. 2 below.

Certainly worthy of mention is the work on Amerindian languages done by Spanish missionaries in the New World. They had composed by 1571 five grammars of Mexican languages (one of Tarasco and four of Nahuatl) and one of the Quechua of Peru. All had attached vocabularies in the local language and Spanish. This was achieved while there were many modern European languages, English and German among them, for which full grammars had not yet been written.

2. The Late Renaissance in Spain

Descriptive grammars of Spanish continued to appear during the second part of the Spanish linguistic Renaissance; many of them, by authors of other nationalities, were published abroad, in England, France, Germany, and Italy. Of those published in Spain the only one worthy of mention is Bartolomé Jiménez Patón's (1569–1640) *Instituciones de la Gramática Española* (Baeza 1614).

The first dictionary of Spanish, by Sebastián de Covarrubias (1539–1613), the *Tesoro de la Lengua Castellana o Española*, was first published in Madrid in 1611. Covarrubias includes archaisms, neologisms, loanwords (many of Amerindian origin, e.g., *canoa* 'canoe,' *hamaca* 'hammock'), and vulgarisms, labeling them as such. Definitions are usually precise and concise but complete, except when dealing with terms related to history, geography, the arts, religion, mythology, or to the exotic. The entries for the latter resemble those of the medieval encyclopedic treatises, as do many of his often incorrect etymologies. The book, however, is of great value for its documentation of the lexicon of the period, and for the interpretation of the writings of Covarrubias's contemporaries.

2.1 Sanctius (1523–1600)

Francisco Sánchez de las Brozas (Sanctius or 'el Brocense') was born in western Spain, but spent his early life in the service of the Portuguese court. After returning to Spain at age 20 he dedicated himself almost entirely to the academic life. He studied at the Universities of Valladolid and Salamanca, and in 1554 became a *praeceptor* 'lecturer' at the Trilingual (Latin, Greek, Hebrew) College of the latter university. In 1573 he obtained the Chair of Rhetoric, and later those of Greek and Latin, all at Salamanca. In addition to those books mentioned above he wrote treatises on rhetoric, philosophy, and theology, as well as translations, and editions of literary works.

In 1584 Sanctius was ordered to appear before the Inquisitorial Tribunal in Valladolid, was reprimanded for his textual interpretation, and warned that future errors would be severely punished. In 1593, the year of his retirement from the university, he was again investigated by the Inquisition. Sanctius died before the end of his trial, and was denied burial honors. The Inquisition's preoccupation with Renaissance philology and grammar is evident from the pejorative use of the word *gramático* 'grammarian' during the trial, when addressing Sanctius. This explains why Sanctius (and later Correas, see below) never wrote a treatise on grammatical theory, on linguistics as such. His ideas on the subject have to be culled from a book that is in appearance nothing more than a study of Latin grammar, his *Minerva: seu de Causis Linguae Latinae* (Salamanca 1587).

Sanctius' approach to grammar and language can be placed in the same mentalist, rationalist, tradition of medieval speculative grammar which developed the ideas first posited in Aristotle's *Peri hermeneias*. The full title of his *Minerva* (see above) shows that he acknowledged a debt to Julius Caesar Scaliger's (1484–1558) *De Causis Linguae Latinae* (1540); his influence on the Port-Royal grammarians was expressly recognized by one of the authors (Claude Lancelot) of the *Grammaire Générale et Raisonnée* (1660).

There are, however, major differences between Sanctius and those that precede or follow him. Sanctius is the only one to postulate an underlying structure that is syntactic rather than semantic in nature, as well as the only one to postulate a grammatical or syntactic system, rather than a purely logical one. He will constantly justify what he says by referring to *grammaticae ratio* 'grammatical system or logic.' His underlying structure not only includes elements that must be understood as deleted from the surface; it also includes grammatical forms that, as Sanctius shows, are essential at that level but cannot appear in the surface. In the *Minerva* the perfect grammarian is defined as one who in Cicero's or Virgil's books will identify which words are nouns, which are verbs, as well as other matters that concern only grammar, even if he does not understand the meanings of the words. Not until much later can one find a statement that so clearly upholds the autonomy of grammar. Sanctius did not develop a system of rules to relate his two levels of syntactic structures, but the *Minerva* is nearer to modern generative grammar than any other work written before the twentieth century.

2.2 Other Theoretical Grammarians

Two other Spanish grammarians of the seventeenth century show a major interest in grammatical theory, Correas and Caramuel. The former applied and developed the ideas of Sanctius, the latter represented a return to late medieval grammatical thought.

Gonzalo Correas (1571?–1631) was born in the same area of western Spain as Sanctius. Correas taught Greek and Hebrew at the University of Salamanca. He published grammars of Greek, Latin, and Spanish (and a now lost one on Hebrew), edited and translated Classical works, compiled a collection of Spanish proverbs and popular sayings, and composed some minor poetry in Greek, Latin, and Spanish. In his time he was very well-known for several treatises proposing the radical reform of Spanish orthography.

Correas was the most important follower in Spain of the author of the *Minerva*. Like Sanctius, Correas never wrote a linguistic treatise as such. His ideas on grammatical theory and universal grammar appear in the *Arte Grande de la Lengua Castellana*, an excellent and lengthy grammar of Spanish finished in 1626 but not published until this century, and in the *Trilingüe de Tres Lenguas* (Salamanca 1627), which includes grammars of Spanish, Latin, and Greek, all written in Spanish. Correas held that grammar (i.e., syntax) was for the most part common to all languages, and made use of this idea in writing the *Trilingüe*. In his treatment of syntax he closely follows Sanctius.

Juan Caramuel y Lobkowitz (1606–82) was a bishop who subscribed to the ideas of Scholasticism. His only book on grammar, the *Grammatica Audax* (Frankfurt 1654), dealt with Latin. He was a follower of the medieval *Modistae* and their speculative grammar, particularly of Thomas of Erfurt, whose *De Modis Significandi sive Grammatica Speculativa* (ca. 1305) was at the time attributed to Johannes Duns Scotus (Caramuel claimed to be a follower of Duns Scotus). Caramuel's *Grammatica* anticipates the semantic and logical position of the authors of the Port-Royal grammar.

3. The Preoccupation with Orthography

The first treatment of the writing system of Spanish appears in Enrique de Villena's (1384–1434) *Arte de Trovar*, completed in 1433. It is an interesting work, but it should be studied in the context of the Middle Ages rather than here. The first to treat this subject in the Renaissance was Antonio de Nebrija in his 1492 *Gramática de la Lengua Castellana* and later in his *Reglas de Orthographia en la Lengua Castellana* (Alcalá de Henares 1517). Nebrija is perfectly aware of the difference between letter and sound of language; in the *Reglas* he very clearly states that a letter is nothing but a mark or figure through which a sound of language is represented. In the same book he says that humans can make an infinite number of sounds, but that each language has a limited number of specifically linguistic sounds, showing his awareness of what modern linguistics calls 'phonemes.'

Writing after the invention of printing, Nebrija shared with many of his contemporaries the preoccupation with the standardization of orthography, to the point of suggesting that the standardized form be enforced by royal decree. Spelling, Nebrija says, should show a one-to-one relationship between letters and sounds; both in the *Gramática* and in the *Reglas* he insists on requiring that one write as one speaks, and vice versa. Nebrija proposed the reform of Spanish orthography to make it adjust to the above ideal of biuniqueness. This concern with the correspondence between speech sounds and letters will be shared up to the late twentieth century by most Spanish grammarians.

The most interesting proposals for spelling reform during the later Renaissance are those of Mateo Alemán (ca.1547–1614), a major literary figure whose *Ortografía Castellana* (Mexico 1609) reflected the changes which had taken place in Spanish pronunciation since Nebrija's time, and those of Gonzalo Correas, whose *Nueva i Zierta Ortografía Kastellana* (Salamanca 1624) and *Ortografía Kastellana Nueva i Perfeta* (Salamanca 1630), reflect in their titles some of the changes he proposed.

4. Historical Linguistics

As stated previously, during the early Renaissance vernacular humanism ran parallel to Classical humanism, very often in the same author. Proponents of the merits of the vernacular languages were familiar with the mostly mythological histories of Latin and Hebrew, and felt the need to give a similar historical background to their own languages. Nebrija in the introduction to his Spanish *Gramática* gave a nutshell history of the Spanish language; he correctly saw Castilian as developing from the 'corruption' of Classical Latin. Since he perceived the latter as the most perfect of languages, claiming it as the ancestor could not but enhance Castilian, even if corruption was the link between the two. The idea, essentially correct, was embraced by grammarians and authors of treatises on language during most of the sixteenth century. However, perception of Spanish as an imperial language, spoken by the rulers of the Low Countries, most of Italy, and immense territories in the New World, Asia, and the Pacific Ocean, made scholars desire an even more illustrious beginning for the language. Spain was not in this alone; most of Europe was making fantastic claims for the particular vernacular of each country.

In this context, in 1588, 'relics' were found in Granada, among which were manuscripts supposedly dating from the first century AD, some written in Latin, others in Castilian. Some of the documents in Castilian were attributed to St Cecil, disciple of St James the Apostle, patron of Spain. Until the end of the seventeenth century, when the Vatican declared that the 'relics' were false, they served to validate claims that Castilian developed independently, rather than being a 'corruption' of Latin, and was at least as old as the latter. The first history of the Spanish language, Bernardo José de Aldrete's (1560–1641) *Del Origen y Principio de la Lengua Castellana o Romance que Oi se Usa en España* (Rome 1606), was written to combat this so-called 'theory of early Castilian.' Aldrete, although himself a member of the clergy, published his book in Rome to avoid conflict with the Spanish Church and Inquisition. For the same reason, rather than questioning the authenticity of the 'relics,' he said that the documents were written in Spanish not because the language was spoken in the first century AD, but because St Cecil had worked the miracle of writing in a language which would not exist until a thousand years later. By giving a miracle as an alternative explanation, Aldrete obviously hoped to safeguard his work from attacks by the Church. Aldrete's book is more modern than any written on historical linguistics up to the end of the eighteenth century.

5. Dialects and Sociolects

A number of the grammarians working with the vernaculars during the Renaissance noted the geographic and social variety occurring in those languages. As early as 1535 Juan de Valdés in his *Diálogo de la Lengua* said that there were many varieties of Castilian because it was spoken in many regions, each region having vocabulary items and pronunciation that were peculiar to it. He points out two reasons for this variety: diversity of realms, and contact with speakers from neighboring regions. In his *Del Origen y Principio* Bernardo José de Aldrete devotes one whole chapter to dialects, calling them by that same name. Aldrete states that there are as many dialects of one same language as there is geographic diversity. He points to differences between rural and urban speech. He goes on to say that there is diversity even within a city, if it is large enough, as well as between speakers from lowlands and mountains in rural areas.

Sebastián de Covarrubias' *Tesoro* is the first Spanish dictionary which gives a definition of dialect. It is, Covarrubias says, that which is peculiar to each language, through which we distinguish the speech of Old and New Castile, of Andalusia, and of other regions, where, even though the same Castilian language is spoken, there are different manners of pronunciation and of forming vocabulary; and all other nations have these same differences that distinguish people from one province from those of another. Covarrubias often points out the regional and social usage of the words he defines.

Gonzalo Correas in his *Arte grande* called for a standard or norm, that of pure Castilian. This notwithstanding, he criticized some aspects of the language in Castile. Throughout the book he discusses regional differences, those that are morphological or syntactic as well as those that occur in pronunciation and vocabulary. He even recognized social variety, indicating that this occurs because of age, social class, sex, profession or occupation, and rural or urban condition. More importantly, Correas stated that each social variety, each sociolect, was as valid within its context as any other, specifically indicating that the linguistic style of the court and nobility was only one part of each language, other styles being just as good and as elegant for their speakers and circumstances.

Dialectology and sociolinguistics did not come into their own until much later. However, modern linguists will not find fault in the above ideas of the Spanish Renaissance concerning geographic and social variety.

Bibliography

Breva-Claramonte M 1983 *Sanctius' Theory of Language: A Contribution to the History of Renaissance Linguistics.* Benjamins, Amsterdam

Lázaro Carreter F 1985 *Las ideas lingüísticas en España durante el siglo XVIII*, 2nd edn. Crítica, Barcelona

Lépinette B 1989 Contribution à l'étude du *Tesoro* de Sebastián de Covarrubias (1611). *Historiographia Linguistica* **16**: 257–310

Niederehe H-J 1994 *Bibliografía cronológica de la lingüística, la gramática y la lexicografía del español des de los principios hasta el año 1600.* Benjamins, Amsterdam

Padley G A 1976 *Grammatical Theory in Western Europe 1500–1700: The Latin Tradition.* Cambridge University Press, Cambridge

Padley G A 1985 *Grammatical Theory in Western Europe 1500–1700: Trends in Vernacular Grammar I.* Cambridge University Press, Cambridge

Quilis A, Niederehe H-J (eds.) 1986 *The History of Linguistics in Spain.* Benjamins, Amsterdam

Robins R H 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Tusón J 1982 *Aproximación a la Historia de la Lingüística.* Teide, Barcelona

Zamora Munné J C 1993 *Historiografía lingüística. Edad Media y Renacimiento.* Colegio de España, Salamanca

Renaissance Linguistics in France

Douglas A. Kibbee

Linguistic description of French was unknown in France before the sixteenth century. The first works relating to the grammar of French were written in England, starting from the mid- to late-thirteenth century and settling into a set group of texts (dialogs, orthography, morphology, lexicon) by the end of the fourteenth century. The most complete grammar of French and one of the best dictionaries of French available before 1600 was John Palsgrave's *Lesclarcissement de la langue françoyse* (1530; see Kibbee 1991).

In France the study of French got a later start, beginning only in the 1530s after Geoffroy Tory's appeal to bring French under the control of rules (in the *Champ fleury*, 1529). This motivation emphasized morphology more than syntax, and evolved into a tradition of grammatical description continued by Louis Meigret (1550), Robert Estienne (1557), and Ramus (Pierre de la Ramée; 1562 and 1572). A parallel tradition of grammars for the learning of French as a second language developed in France and the Low Countries, with Jean Pillot (1550), Jean Garnier (1558), Gabriel Meurier (many works, starting from 1553), and Antoine Cauchie (1570). The study of the French lexicon developed in a flourishing dictionary tradition, although it remained during the sixteenth century a tradition of bilingual dictionaries, primarily French–Latin (Robert Estienne, continued and amplified by his understudies), with some French–Greek works (Budé and Henri Estienne). Collections of real and imagined etymologies (Perion 1555, Trippault 1580, H. Estienne 1565 (Book III), and Guichard 1610) added an historical component to the lexical field. These reference works provided the raw material for a lexical debate focusing on the acceptable expansion of vocabulary, primarily through introduction of foreign dialectal and archaic words and the creation of neologisms. It involved translators, lexicographers, lawyers, and men of letters, featuring Du Bellay and Ronsard from the literary perspective as well as Henri Estienne, Abel Mathieu, and many others from a more linguistic background.

A lively orthographic debate raged at the midpoint of the century, pitting proponents of univocity (one letter should equal one sound) against conservators of etymological spelling. Meigret and Ramus led the charge of the reformers (religious as well as orthographic) and the movement largely died with them. (Meigret died ca.1558; Ramus in the St Bartholomew's Day massacre of 1572.)

The subjective essays on French often draw on all these traditions. The evaluation of the vernacular attempted to define the 'naive puissance' of French, those features of French which distinguished it from its rivals, both ancient and modern. Henri Estienne, in his diatribes against Italian (especially 1578 and 1579), is the best-known polemicist for the French language, a tradition which continues to this day (but usually outside linguistic circles).

1. Morphology and Syntax

The grammarians of the sixteenth century started from the grammatical categories developed in the Greco–Latin tradition (especially Priscian and Donatus). This tradition is strong in the description and classification of morphology, less so in the description of syntax. Already in the 1520s, Robert Estienne published guides to the conjugation of French verbs and declension of nouns, manuals designed to help translators accurately render Latin into French. Thus his grammar (1557) lists three different ways of forming the pluperfect 'conjunctive,' using the forms which, in the twentieth century, would be called the past conditional, the pluperfect subjunctive, and the pluperfect indicative. Since each can be used to translate the Latin pluperfect subjunctive, they are grouped in one category. Because these efforts did not describe French on its own terms, the first descriptions of French frequently include such categories as 'optative' mood in the verb conjugations and full six-case nominal and pronominal declensions. Applying such categories to French required grammarians to turn to semantic rather than morphological definitions of grammatical features, a move which paved the way for more abstract mentalist grammars in the seventeenth century.

Syntax in these grammars was generally limited to questions of agreement. Peculiarities in popular usage (e.g., *j'aimons*) were universally condemned while the agreement of the past participle was a point of contention between the latinizing grammarians (Dubois) and those who felt more constrained by usage. Syntactic arguments were often invoked to resolve problems of morphological classification, particularly by Meigret and Ramus, but syntax in its own right held less interest for the grammarians of the sixteenth century than did morphology.

1.1 Jacques Dubois (Sylvius: 1478–1555)

The first grammar of French published in France was the *Isagoge in linguam gallicam* (1531), written by Jacques Dubois, a Picard physician whose medical writings were far more successful. It is divided into two parts, the *Etymologica* and the *Grammatica Latino–gallica.* The first part is an inventory of Latin–French letter correspondences, in which Dubois took no notice of the effect of context. Thus he notes that Latin ⟨a⟩ can end up in French as ⟨a⟩, ⟨e⟩, ⟨i⟩, ⟨o⟩, ⟨ou⟩, ⟨ea⟩, ⟨ai⟩, or ⟨au⟩ without specifying in which contexts each of these changes took place.

In the grammar, Dubois sought to put French under the control of rules by reestablishing some parts of Latin usage that French had abandoned. His grammar follows the linguistic categories of Donatus, and explains how Latin forms are rendered in French. As he considered the differences between French and Latin 'corruptions,' he sometimes recommended the substitution of Picard forms and practices for those of Paris, finding that his native dialect was closer to Latin. Meigret attacked the *Isagoge* for its failure to observe and follow usage, while Robert Estienne condemned the dialectal features. It was never reprinted.

1.2 Louis Meigret (ca.1500–ca.1558)

Louis Meigret, born into a well-known Lyons family, was an active translator, proponent of orthographic reform, and the author of the *Tretté de la grammere françoeze* (1550), a much stronger effort in the description of French than the work of Dubois. He opens with a description of the sounds of French, a study which profited from his attempts at orthographic reform. Because of the radical reforms he proposed, he was forced to consider sounds rather than letters, a major advance which was largely ignored once the orthographic question was settled in favor of more traditional spelling. The rest of the grammar is devoted to the eight parts of speech, with the article (definite article only) inserted before the section on nouns. Meigret leans towards semantic definitions of grammatical categories, but he does invoke morphology to deny the existence of neuter gender and nominal declension in French.

1.3 Robert Estienne (1503–59) and Henri Estienne (1531–98)

Robert Estienne's *Traicté de la grammaire françoise* (1557) is a catalog of French morphology, derived in part from his earlier guides to conjugation and declension, in part from the works of Dubois and especially Meigret. Estienne admits in his preface that the complaints about the orthography of Meigret's *Tretté* inspired his own efforts. Estienne's grammar is remarkable only for the clarity of its layout, testimony more to his skills as a printer than to his skills as a grammarian. Robert Estienne deserves much greater recognition for his lexicographic work (see Sect. 3).

Robert's son, Henri, wrote the *Hypomneses de gallica lingua* (1582) as a supplement to his father's grammatical work, adding a long description of sounds, and devoting the last 60 pages to assorted problems in syntax and semantics, including changes in meaning between preposed and postposed adjectives and various aspects of article usage. Although hardly complete, these often rich commentaries venture into new areas in the description of French.

1.4 Ramus (Pierre de la Ramée: 1515–72)

Ramus was an ardent opponent of scholastic philosophy, which earned him the enmity of conservative Catholic theologians at the Sorbonne. He wrote widely on philosophical, rhetorical, and grammatical questions, treating Latin and Greek grammar in the 1550s before writing the *Gramere* (1562), which he revised and transformed into traditional orthography in the *Grammaire* (1572). His basis in philosophy led Ramus to question methodological practices in grammatical description, and he makes significant innovations in his insistence on using formal distinctions and complementary distribution to define grammatical categories. This organizational consistency, however, leads to many grammatical inconsistencies.

The *Gramere* is divided into two parts, like Dubois's, etymology and syntax. Etymology includes the description of sounds and derivational and inflectional morphology. The strict application of his formalistic approach forces him to consider synthetic comparatives (e.g., *meilleur*) in the first part, and analytic comparative (*plus beau*) in the second. The confusion in the definition of moods leads him to reject the category altogether. The basic information included in these works is taken mainly from Meigret. In the second edition, inspired by Henri Estienne's *Traicté de la conformité du langage françois avec le grec* (1565), Ramus pleaded for French grammar to be considered on its own terms, not in the light of Latin, but it was precisely his own reliance on Latin models that led him astray in many of his arguments.

2. Orthography and Pronunciation

Pronunciation *per se* was rarely dealt with directly in French treatises of the sixteenth century. Instead, grammarians concentrated on the relationship between letters and the sounds they represent. The reformers insisted on a principle of strict univocity (one letter = one sound), while conservatives found a variety of reasons to maintain traditional spelling. Still, in debating the merits of different spelling systems, the grammarians had to confront real issues in the description of the French sound system, such as the lack of orthographic symbols to represent the French sounds which did not exist in Latin (e.g., [ʃ], [ʒ], [z], [v], nasal vowels, schwa, etc.).

Towards the end of the century, the most significant efforts in the description of the French sound system came in works destined for foreign learners of French. Jacques Bellot (fl.1580–90), a native of Caen who taught French in England, developed a crude descriptive method for describing point and manner of articulation in phonetics. Claude de Sainliens (Hollyband; d.1597), whose *French Schoolemaister* (1573) and *Frenche Littelton* (1576) remained basic texts for teaching French to English speakers well into the seventeenth century, offered a strong defense of traditional orthography in his *De pronuntiatione linguae gallicae* (1580), although he used diacritics to mark silent letters. Théodore de Bèze (1519–1605) wrote his excellent study *De francicae linguae recta pronuntiatione tractatus* (1584) for German-speaking students in Switzerland.

The orthographic debate was launched by Tory's *Champ fleury*, in which the printer from Bourges noted the variety of pronunciations represented by the letters ⟨e⟩ and ⟨c⟩. Tory inspired an unknown author from Abbeville (Picardy) to compose the *Tres utile et compendieux traité de l'art et science d'orthographie gallicane* (1529), a work which proposed a more conservative (i.e., more Latinate) spelling in order to better distinguish homonyms. Dubois follows this line of reasoning when he proposes that *lisons* (from *lire*), be written *ligons* because in Latin there is a ⟨g⟩ (*legamus*). To accommodate French pronunciation and Latin etymons, Dubois experimented with some new symbols such as ⟨$\overset{s}{g}$⟩ for the /s/ in *lisons*. In the same year as Dubois's treatise (1531), Tory introduced the use of the cédille. In 1533 appeared the *Briefve doctrine pour deuement escripre selon la proprieté du langaige francoys*, possibly written by Clément Marot. This work tries to regularize the use of various diacritics in French, including the apostrophe, grave and acute accents, cedilla, circumflex accent, and the diaeresis. Many of these innovations were incorporated into the last section of Etienne Dolet's *La Maniere de bien traduire d'une langue en aultre. D'advantage. De la punctuation de la langue Francoyse. Plus, Des accents d'ycelle* (1540).

2.1 Louis Meigret, Guillaume des Autels (1529–81), and Jacques Peletier du Mans (1517–82)

Louis Meigret also reacted quickly to Tory's appeal, composing a manifesto for orthographic reform (*Traité touchant le commun usage de l'escriture françoise auquel est debattu des faultes et abus en la vraye et ancienne puissance des letres*) and a sample text in his new orthography (his translation of Pliny the Elder). However, his reforms were considered too radical, and these works, written ca.1531, were not printed until 1542 and 1543 respectively, and then only after they had been put into more standard orthography. A second edition of the treatise appeared in 1545. After some minor reforms incorporated into Meigret's translation of Cicero (1547), the real breakthrough occurred in 1548, with the publication of Meigret's translation of Lucian's *Philopseudes*, printed entirely in Meigret's reformed orthography by Christian Wechel. This translation inspired responses from Jacques Peletier du Mans (*Dialogue de l'orthografe e pro-*

nonciacion françoeze and *Apolojie à Louis Meigret Lyonnais*, 1550) and Guillaume des Autels (*De l'antique escriture de la langue française et de sa poesie, contre l'orthographe des Maigretistes*, 1548; published at the behest of Philippe Le Brun under the pseudonym Glaumalis de Vezelet). Peletier du Mans had already published (1545) in the introduction to his translation of Horace a letter outlining his sympathetic but cautious views on orthographic reform. To these critics Meigret responded with his usual venom, in the *Défenses de Louis Meigret touchant son orthographie française contre les censures et calomnies de Glaumalis de Vezelet et de ses adhérents* and *La response de Louis Meigret à l'Apolojie de Jacques Peletier* (both 1550). Des Autels fought back with his *Replique de Guillaume des Autels aux furieuses defenses de Louis Meigret* (1551), which Meigret parried with the *Reponse de Louis Meigret à la dezesperée repliqe de Glaomalis de Vezelet, transformé en Gyllaome des Aotels* (1551).

Meigret identified three problems with French spelling: *superfluité* (letters which are not pronounced), *diminution* (sounds pronounced which are not reflected by letters), and *usurpation* (one letter is pronounced like another). By far the most common offense against reason in French orthography is the first, a weakness Peletier du Mans was willing to attack. However, he opposed most changes designed to remedy the second and third types of orthographic heresy (according to Meigret), which required more radical changes of habit.

The conservatives, represented by des Autels, argued that traditional spelling clarified the diachronic relationships between etymons and contemporary words as well as the synchronic relationships between words of the same family. The maintenance of these etymological letters also helped foreigners learning French, presumably because they would already be conversant with Latin. Second, no spelling system could represent all the varieties of pronunciation: each person would spell differently. Third, as pronunciation changed from period to period spelling would be in a constant state of flux. These arguments, aided by the inertia of a literate public unwilling to master a new system, won the day, and spelling reform ever since has limited itself to minor points (e.g., the acceptance in 1835 of the spelling *-ais* for the imperfect endings). Meigret himself was forced to abandon his reformed orthography by printers who preferred profit to reason; the last translations he composed were printed in traditional orthography.

2.2 Ramus, Honorat Rambaud (fl.1580), and Laurent Joubert (1529–83)

In the last part of the sixteenth century, some appeals for reformed orthography continued to be heard—Ramus in the first edition of his *Gramere*, Rambaud in the *Declaration des abus que l'on commet en écrivant, et le moyen de les éviter et représenter naïvement les paroles* (1578), and Joubert in the *Dialogue sur la Cacographie fransaise* (a supplement to his *Traité du ris*, 1579). Rambaud went so far as to create a whole new alphabet of 52 characters which, while simplifying sound-letter correspondences, complicated all other aspects of reading. Joubert's dialog blames the confusion in French spelling on Germanic influence, which, according to him, encouraged clusters of consonants (e.g., *prebstre*) lacking in the other Romance languages. By the end of the century orthographic theory and practice had settled down into a somewhat reformed position: the exaggerated etymological letters had been dropped, but many unpronounced letters, in particular ⟨s⟩ in word-final and preconsonantal position, remained.

3. Lexicography

All the dictionaries relating to French in the sixteenth century were bilingual dictionaries, but the amount of information about the French words increased steadily, approaching French definitions of French words. That stage was finally reached with Nicot's dictionary (1606). As Latin word-lists such as Alexander Neckham's *De ustensilibus* and John of Garland's *Synonyma* (twelfth century) grew into large manuscript dictionaries such as Giovanni Balbi's *Catholicon* (fourteenth century) and the *Dictionarium* by Firmin Le Ver (1440; cf. Merrilees & Edwards 1994), the French glosses to these works became more and more informative about the vulgar language. The humanists, however, were repulsed by the medieval Latin additions to these dictionaries. Robert Estienne's work as a lexicographer grew out of his printing business, where he produced scholarly editions of newly discovered or newly collated Latin manuscripts. As the number of such editions grew, and as the translation of those editions into French became a more popular and more profitable enterprise for the printing world, the quantity and quality of French lexicography improved.

Robert Estienne's Latin and Latin–French dictionaries served as the lexicographic model for dictionaries produced all over Europe, establishing the selection of words included, the examples provided, the order followed. The words had to be found in classical authors, the examples, where possible, in editions Estienne himself produced. Estienne replaced the topical organization preferred in most earlier dictionaries with an alphabetic organization that simplified the use of dictionaries as a reference tool.

The first Estienne-produced dictionary, the *Thesaurus linguae latinae* (1531), already included French equivalents, which were expanded in the 1536 edition. In 1538 he published his first fully bilingual dictionary, the *Dictionarium latino–gallicum* (Latin–French), which he reversed in 1539 to produce the *Dictionnaire françois–latin*. Estienne expanded this work, numbering about 9,000 entries, to 13,000 entries in the 1549 edition. A major step towards the creation of a French–French dictionary was the inclusion of French words drawn from sixteenth-century French authors in the 1549 edition. The work was reissued in 1564 by Thierry and in 1573 by Jean Nicot (1530?–1604), and the French added to or replaced by German, Dutch, and English in a number of lexicographic works published abroad. Thus Estienne's dictionaries had a great influence on lexicography and on the teaching of the French language across Europe. Furthermore, within France, they served to stabilize French vocabulary and standardize forms as they remained the principal lexical reference works until the dictionary of the *Académie française* (1694).

4. History of the French Language in the Sixteenth Century

In the sixteenth century, the history of the French language served as primary evidence in the history of French institutions. The history of those institutions was itself crucial to the debate on the role of the monarchy, in turn related to the Wars of Religion. French clearly had close affinity to Latin, and thus to Italian and Spanish. However, humanist admiration for Greek, Reform interest in Hebrew, and concurrent bursts of celtomania and xenophobia led to theories of the origin of the French language which resolutely pursued the implausible.

The thesis that French had Greek origins was supported by a number of Classical and biblical sources (Léon Trippault provides a summary in an appendix to his *Celt–hellenisme, ou etymologic des mots francois tirez du graec. Plus. Preuves en general de la descente de nostre langue*, 1580). Many historians of French claimed that the Gauls spoke Greek or some closely related language. In this way native gallican interests could be allied with the most prestigious of the ancient languages (and opposed to Italian/Latin). This linkage took on political significance in works such as François Hotman's *Franco–gallia* (1573), in which evidence from diachronic linguistics was adduced to provide an historical basis for elected, constitutional monarchy and customary law, as opposed to divine-right absolute monarchy and Roman law.

At the same time, other scholars sought to establish links between Hebrew and French. Guillaume Postel (*Linguarum duodecim characteribus differentium alphabetum, introductio, ac legendi modus longè facilimus*, 1538) provided a basis for this work, which received occasional mention in the works of Joachim Perion (*Dialogorum de linguae Gallicæ origine, eiusque cum Græca cognatione, libri quatuor*, 1555) and Trippault, and culminated in Estienne Guichard's *L'harmonie étymologique des langues hébraïque, chaldaïque, syriaque, en laquelle par plusieurs Antiquitez et Etymologies de toute sorte se demonstre evidemment que toutes les langues sont descendues de l'Hébraïque* (1610).

Such historical evidence was necessarily impressionistic, generally based on word-lists of fewer than 500 entries (Joachim Perion, Léon Trippault). The dangers of basing such conclusions on small lists of words led the more linguistically sophisticated Henri Estienne to argue not for a Greek origin of French, but rather closer affinity between constructions of modern French with ancient Greek (*Traicté de la conformité du langage françois avec le grec*, 1565). Even in these small word-lists many of the etymologies were erroneous, for greater emphasis was placed on semantic similarity than on regular sound (letter) changes. One or two similar letters and a plausible story relating the meaning of French and Greek words were enough to establish the etymological link.

As the sixteenth century wore on, the flaws in this method became apparent. Abel Mathieu (*Devis de la langue françoyse*, 1559; *Second devis et principal propos de la langue françoyse*, 1560) established that many of the legitimate etymologies relating French to Greek words were words only recently introduced into French, in the wave of neologisms that accompanied the translation of Classical works into French. This theme was picked up by Etienne Pasquier (*Recherches sur la France*, 1560) and Claude Fauchet (*Recueil de l'origine de la langue et poesie françoise*, 1581), who first traced the history of medieval French literature. The absence of the supposedly Greek words in those texts helped destroy the myth of the Greek origins of the French language. Equally important, a new attitude towards etymology, insisting on methodical links between letters rather than on subjective impressions based on a limited portion of the complete lexical corpus, and a recognition of the difference between Vulgar Latin and Classical Latin, improved the accuracy of historical speculation. Jacques Bourgoing, counselor to the king, demonstrated the usefulness of the comparative method to correct the errors of the Grecophile etymologists in his *De origine usu et ratione vulgarium vocum linguæ Gallicæ, Italicæ, & Hispanicæ, libri primi sive A, centuria una* (1583), thus setting the foundation for seventeenth-century historical work, such as Ménage's *Les origines de la langue française* (1650).

5. Subjective Appreciation of Language

The establishment of standard languages and the competition for preferred status among the modern languages in the sixteenth century inspired a number of observations, both within grammatical works and in special volumes dedicated to the subject, concerning the relative merits of European languages. Works such as Du Bellay's *Deffence et illustration de la langue françoyse* (1549) and Ronsard's *Abrégé de l'art poétique* (1565) served this purpose on the literary side, while Henri Estienne provided the most pointed remarks from a more linguistic frame of mind (*Deux dialogues du nouveau langage françois italianizé*, 1578;

Project du livre intitulé de la precellence du langage françois, 1579). The authors of such comments directed their attacks not only at competing vernaculars (especially Italian), but also at 'nonstandard' forms of their own language. Early in the century dialectal forms were viewed approvingly as enriching the word-stock of French, but as religious intolerance grew in the period of the Wars of Religion so too did linguistic intolerance. Meigret attacks what he labels the 'effeminate' usage of the court as well as the Picardisms of Dubois, only to be attacked himself for dialectal features of his native Lyonnais. Picard, Gascon, and Norman pronunciation are noted and rejected in orthographic and pronunciation texts, and a number of other dialects are noted (disapprovingly) in dictionaries. Thus the stage was set for the linguistic absolutism of Malherbe, Vaugelas, and Bouhours in the seventeenth century.

Bibliography

Brunot F 1906 *Histoire de la langue françoise des origines à 1900, Tome II: seizième siècle.* A. Colin, Paris

Catach N 1968 *L'orthographe française à l'époque de la Renaissance: Auteurs, Imprimeurs, Ateliers d'imprimerie.* Droz, Geneva

Chevalier J-C 1968 *Histoire de la syntaxe: naissance de la notion de complément dans la grammaire française (1530–1750).* Droz, Geneva

Kibbee D A 1991 *For To Speke Frenche Trewely. The French Language in England, 1000–1600: Its Status, Description and Instruction.* Benjamins, Amsterdam

Livet C-L 1859 *La grammaire française et les grammairiens du XVI^e^ siècle.* Didier, Paris

Merrilees B, Edwards W (eds.) 1994 *Firmini Verris Dictionarius: Dictionnaire latin-français de Firmin Le Ver.* Brepols, Turnhout

Stengel E 1976 (1st edn. 1890) *Chronologisches Verzeichnis französischer Grammatiken vom Ende des 14. bis zum Ausgange des 18. Jahrhunderts nebst Angabe der bisher ermittelten Fundorte derselben* (With additions by H-J Niederehe). Benjamins, Amsterdam

Swiggers P, Hoecke W van 1989 *La langue française au XVI^e^ siècle: usage, enseignement et approches descriptives.* Peeters, Louvain

Thurot C 1966 (1st edn. 1881) *De la prononciation française depuis le commencement du XVI^e^ siècle, d'après les témoignages des grammairiens.* Slatkine Reprints, Geneva

Trudeau D 1992 *Les Inventeurs du bon usage (1529–1647).* Minuit, Paris

SECTION VIII

17th and 18th Century Europe

SECTION VIII

17th and 18th Century Europe

Port-Royal Tradition of General Grammar

Garon Wheeler

Port-Royal was the name of a convent established near Paris in the early thirteenth century. In linguistics, it refers to a small group of Jansenist religious figures in the mid-seventeenth century whose community, affiliated with the convent, was a center of intellectual activity. Several works on language by Claude Lancelot and Antoine Arnauld were highly influential at the time. The most notable, the *Grammaire Générale et Raisonée* (GGR) of 1660, set the course of language studies in France away from prescriptivism to a concern with language itself for the following 150 years. Its 'rediscovery' in the mid-1960s by Noam Chomsky greatly aided in an awakening of interest in the history of linguistics of that era.

The GGR is a small book of 150 pages or so. It is divided into two sections; the first examines briefly the physical aspect of language. The heart of the work is the second section, in which the various parts of speech are analyzed from a 'universal' standpoint. The GGR closes with a short chapter on syntax, including a look at modes of figurative language. It is the notion of ellipsis, especially as applied to Arnauld's analysis of relative clauses, which piqued the interest of linguists in the 1960s who were looking for historical antecedents to transformational grammar.

1. Background

The Modistae of the thirteenth and fourteenth centuries, adopting many ideas from Aristotle, interrupted centuries of prescriptivist studies by taking up what is referred to as 'speculative grammar.' In attempting to get inside the mind of the speaker, they theorized about the 'modes' of thinking and their reflection in speech. For them, there was a single, underlying grammar which was realized independently in different languages. For the first time since the ancient Greeks, language as a system was the object of study rather than prescriptive rules and concern with felicitous expression.

After a lull of two centuries or so, interest in general grammar (or 'rational' grammar, as the terms are used interchangeably) arose in the form of investigations of Latin, for it was believed that what was true for Latin would hold for other languages as well. *De Causis Linguae Latinae* (1540), by Julius Caesar Scaliger (1484–1558), marked a return to and development of many principles of language that had been abandoned since the Modistae. Many of Scaliger's ideas—or, more precisely, his rationalistic approach to language—were to filter down to the next century, particularly via Franciscus Sanctius (1523–1601), into the GGR and then into the general circulation of grammatical thought. Sanctius's *Minerva seu de Causis Linguae Latinae* was published in 1587. As an early rationalist, he saw an explanation for everything in the human world; language was no exception. He explicitly rejected the notion of acceptance of linguistic forms merely from usage dictated by authority, putting him in opposition to the prescriptive mode of grammatical studies that was predominant at the time. The job of the grammarian, he believed, was to uncover the causes of language structure (or, at least, those of Latin). For Sanctius, an essential task was to expand the sentence—to look for the underlying complete form which has been abbreviated in speech, and it is indeed this part which has received the most attention since Chomsky's *Cartesian Linguistics* of 1966. This idea was not new, however, for similar observations may be found in Donatus, Priscian, and Quintilian, and it had been developed substantially by the Modistae and in the fifteenth century by Thomas Linacre (1460–1524). Sanctius's contribution, then, was the extent to which he developed this theory of ellipsis and the importance which he attributed to it.

At the time of the GGR, however, grammatical studies in France were synonymous with a concern over what constituted correct Latin or French. In the case of the latter, great debates about the adequacy of the vernacular had been carried out for well over a century; the result was a gradual acceptance of French and its replacement of Latin as the language of educated discourse. There was a tremendous interest in 'good' versus 'bad' French: it was agreed that the usage of the royal court was the standard. Influential prescriptivists such as Claude Favre de Vaugelas (1595–1649) aided in codifying proper French, and by the time of the GGR in 1660 a relative calm and stability had set in, rendering the public receptive to new ways of examining language.

Works such as Descartes's *Discours de la Méthode* (1640), written in beautiful French prose, helped to consolidate the position of French and create an interest in philosophy. Society of the day took readily to erudite discussions, and the salons of Paris were filled with intellectual dialog. Descartes' rationalistic approach was founded on methodical doubt, which meant examining—or re-examining—all beliefs, no matter how widespread or ingrained their general acceptance might be. Truth was not to be found in the sensory world (for the senses could not be trusted) but rather in the existence of innate ideas. When this kind of rationalism was applied to language, it was to pose the question of what language really was, and what went on in the minds of speakers as they communicated. By far the most influential work of this sort was the GGR of Port-Royal.

2. Port-Royal

Jansenism was an austere Roman Catholic sect whose followers believed that the Church had strayed too far from the teachings of the patriarchs. Their dissatisfaction was aimed in particular at the Jesuits, whose supposedly liberal views were the rule of the day throughout France and much of Europe. The beliefs of the Jansenists were based on their interpretation of Augustine, and the works on language produced by the Port-Royal community sprang from their ideas about children and how they should be educated.

2.1 Lancelot and Arnauld

Very little is known about the personal life and history of Claude Lancelot. He was probably born in 1616, though many sources give it as 1615. At the age of 11, Lancelot entered a seminary, where he remained for 10 years. In 1637, he became one of a handful of young men under the guidance of the Abbé de Saint-Cyran, a close friend of Jansen. These men, the nucleus of what were to become the 'solitaires' of Port-Royal, were grouped together in a building adjacent to the Port-Royal convent, for whom Saint-Cyran was at that time confessor. In addition to the men, Saint-Cyran was in charge of several boys. From the beginning of his stay at Port-Royal, Lancelot took part in the instruction of these children, and in this manner his career as an educator had its origin. Lancelot, perhaps more than anyone else, exemplified the notion of 'solitaire.' He left the disputes and the defense of Port-Royal to other members of the community. He was a man who above all wished to spend his life in the quiet service of God, in the pursuit of knowledge, and in the Christian education of others. He was known foremost for his teaching ability and for his humility, and his life was unmarked by controversy, just as he wanted.

In sharp contrast to Lancelot, the family history of Antoine Arnauld and the details of his life are exceptionally well known, for the Arnaulds had long been a family of distinction. Born in Paris in 1612, he was the son of one of the most celebrated lawyers of his day. By the time Arnauld reached adulthood, his family was already under the influence of Saint-Cyran and Port-Royal. Since 1602, his sister had been abbess of the Port-Royal convent, and many of his relatives were connected with Port-Royal at one time or another. Arnauld became known as the principal spokesman and defender of Port-Royal, and achieved widespread fame in his lifetime as both a theologian and philosopher. The Jansenists' struggle against the Jesuits and the establishment was an acrimonious one, and he found himself in the midst of it from beginning to end.

2.2 The 'Petites-écoles'

The 'petites-écoles' were schools organized and run by the Port-Royal community. There were never more than 50 or so carefully selected students, and the schools lasted just 22 years. Eventually they fell victim to the same political forces that vexed the Jansenists as a religious group.

An understanding of the 'petites-écoles' rests entirely on the view of children that was developed by the Jansenists through Saint-Cyran. These ideas on their nature were in turn the development of Jansen's views on man's fall from grace as a result of original sin. In their pessimistic view, children, born with the burden of original sin, were as vulnerable to sin and temptation as lambs to a wolf; the best opportunity for salvation was an education which enabled them to reach a deep understanding of Church doctrine and consequently to lead a life of righteousness. The key to such an education was a mastery of language, and this was attained by a thorough study of grammar. A solid foundation in grammar assured not merely an education which would be of use in one's business or other chosen field, but had eternal benefits as well: a successful education, Port-Royal style, improved one's chances for the afterlife.

Being an educator, and consequently having the souls of children in one's hands, was for the Port-Royalists the noblest profession in the eyes of God and the Church. A fundamental part of achieving the general education envisaged by Saint-Cyran was to stress judgment. It is here that the GGR and other Port-Royal works on language begin to enter the scene as a part of the Port-Royal plan to develop clear thinking, as shown in the prefatory remarks to the

Logique (1662) by Arnauld and Pierre Nicole: 'the principal task that one should have is to develop one's judgment and to make it as exact as possible, and it is to this end that the bulk of our studies should be directed.' This emphasis on judgment also implied that one should follow reason rather than usage in educational methods. One should strive to find the quickest, easiest methods for teaching, because effort should be spent on working with the subject matter rather than acquiring it.

This conception of education resulted in an approach to teaching languages which represented a significant break with past methods. Traditionally, students in French schools had not studied the vernacular, as this was deemed a subject unworthy of attention. Language study had been limited to Latin and perhaps Greek, both taught via the 'direct method,' which meant studying the target language without the aid of the student's native language. Rather than being the fulfillment of any philosophical approach to teaching language, the direct method had been the one most commonly used simply by default. Since it was the language of education, all textbooks were in Latin, whether the subject was medicine or religion, or Hebrew or Latin itself. Emphasis was on memorization of grammatical rules as well as passages from classical authors, and the composition of strictly prescriptivist themes. In contrast, Lancelot's efforts ensured that the situation at the Port-Royal schools was considerably more enlightened. A thorough grounding in French was considered important before beginning the study of a foreign language. This permitted students to make use of their native language in the study of Latin or Greek; written translations were carried out from the target language to French and vice versa, thereby improving their skills in both languages. Moreover, students were encouraged to seek natural forms of expression in translations into Latin and Greek; the exact words of the author were not required. Style was not unimportant, but language was seen above all as a tool of communication.

3. Port-Royal Works on Language

3.1 La Nouvelle Méthode latine (1644)

The *Nouvelle Méthode pour apprendre facilement et en peu de temps la langue latine* (NML) by Lancelot was first published in 1644, 16 years prior to the GGR. The preface to the NML evaluated the pedagogical situation of Latin at the time and set out many of the philosophical points that were to become central to the Port-Royal schools. Lancelot noted the dissatisfaction with traditional ways of teaching Latin; he informed the reader that he had examined and impartially considered existing methods, and placed much of the blame for this problem squarely on the direct method. Common sense, he said, dictates that the mother tongue should be used to acquire a foreign language, so the first step was to write his grammar in French. He further related that he had done everything in his power to facilitate the use of the book. One may well argue that his efforts were the beginning of modern writing in linguistic pedagogy; a look at any other grammar before the NML reveals what appears in the 1990s to be an indifference to the sensitivities of the learner. Lancelot, on the other hand, took several steps to assist the learner in the use of the book. Since memory, rather than concentration, is the strong suit of children, he therefore decided to give the students rules in French to be memorized. To assist them in this endeavor, Lancelot had the clever idea of putting the rules into verse. In addition, the rules were clearer than in previous grammars (so he claimed), there were plentiful comments and examples, each rule was numbered and had an explanatory title, all Latin words were marked for stress, all endings were written in capital letters, a different style of type was used for Latin and French, and comments to the rules were in smaller print.

The first edition of the NML was a distinct success and was even used by young Louis XIV. Nevertheless, Lancelot saw the possibilities for improvement, and the definitive edition appeared in 1653. The result was an enlarged NML that went beyond a schoolboy's grammar. It is this edition and its descendants that have achieved a modest fame among historians in linguistics, for it marked a turning point in the development of the grammatical thought of Lancelot and was the source of much of the GGR. In the years since the first edition, Lancelot in his studies had come across the works of Vossius, Scioppius, and above all, Sanctius. It is the influence of these scholars that turned the NML from a traditional grammar into one that included numerous observations on the nature of language based on the work of philosophical and speculative grammarians. Lancelot was intrigued in particular by Sanctius's treatment of

> simple construction, when all the terms are expressed in their natural order in such a way that it is clearly seen why one governs the other, [and] figurative construction, when [...] one uses certain devices and certain expressions, because they are either more effective or shorter or more elegant, in which case there are several parts of speech which are implied without being indicated ('Avis au lecteur').

The task of the grammarian, he stated, was to reconcile the figurative construction with the simple, showing that it was indeed created from essential and basic principles of language. In these few lines, one sees that Lancelot's interest in language had led him from the purely pedagogical to a concern with the psychological and even metaphysical aspects of language. The NML was more popular than ever, and appeared in countless editions and in several translations as late as 1819.

Besides the NML, Lancelot also was the author of 'new method' grammars of Italian, Spanish, and above all, Greek, all of which were similar in format to the NML, as well as the highly successful *Jardin des racines greques* (1657).

3.2 The Port-Royal Logic

The *Port-Royal Logic* by Arnauld, along with Pierre Nicole (1625–95), played every bit as important a role in the creation of the GGR. The *Logique* first appeared in 1662, two years after the GGR. However, the *Logique* was actually written at about the same time as the GGR; the first edition of 1662 was in fact the third revision. It was written for a young nobleman and was intended to be a treatise containing the basics of logic, readable in the space of a few days.

The complete title of the book is *Logic or the art of thinking, containing, in addition to the common rules, several new observations, suited to the formation of judgment*. Arnauld and Nicole, noting both the importance of studying logic and the inadequacies found in the texts of the day, thought it would be a public service to take what was useful in training judgment from the standard logics (hence 'the common rules'), and to present this with many observations and reflections of their own.

The four parts of the *Logique* represent what the authors believed were the various operations of the mind—conception, judgment, reasoning, and ordering:

(a) 'Conception' is to draw one's attention to something, or simply to have an idea. An analysis of ideas is the most important part of logic, since they are involved in every operation of the mind. The Cartesian influence is clear: if one can break down the ideas into their component parts and 'see' the idea clearly, one has the basis for correct reasoning.

(b) 'Judgment' is the linking of two ideas, whereby one affirms or denies that what one conceives is such or is not such. A judgment is also a proposition. In its simplest form (e.g., 'The earth is round'), it consists of two terms: a subject ('earth') and a predicate ('round'), which are the objects of our thoughts, or what we conceive (conception). In addition, there is the copula connecting the two terms, whose function is to affirm (judgment). The primary importance ascribed to judgment by Port-Royal/Jansenist philosophy was in contrast to the usual treatment in other books, which treated reasoning as primary and judgment as secondary.

(c) 'Reasoning' is the action of forming a third judgment from two others. To arrive at the truth, one must examine very closely the reasoning one puts forth or accepts, in line with the Cartesian call to examine every belief.

(d) 'Ordering' is the arrangement of various ideas, judgments, and acts of reasoning in the way most suited to arriving at a knowledge of the subject.

The study of logic, Arnauld and Nicole argued, can strengthen one's judgment in the same way as taking medicine can aid the body. The *Logique* was written in a relatively informal style, decidedly not as academic or dry as the traditional texts. It had tremendous success, and its fame continued long after the GGR had been forgotten. In French alone, it was printed 49 times, the last in 1877. In addition, it was published 13 times in Latin and 9 times in English.

3.3 The Grammaire générale et raisonée

The *Grammaire générale et raisonée*, first published in 1660, was the joint effort of Lancelot and Arnauld. Unfortunately, one can only speculate as to how the GGR was actually used, for the Port-Royal schools, already severely restricted by the French government for several years, were closed for good not long afterwards. It was, nevertheless, an immediate success among the general public, and a great number of editions appeared in various languages for nearly two centuries.

The idea for the GGR came from Lancelot, whose intention was to create a sort of guide to facilitate the study of any language. To accomplish his goal, he and Arnauld endeavored to find principles of language which would be independent of time and place. These principles, they believed, could be found from an examination of different languages. Then, rather than simply describing them, they attempted to explain them in the hope of shedding light on the characteristics shared by all languages. This lofty objective should not be confused with the search for 'universals' in modern linguistics, however. For Lancelot and Arnauld, the characteristics common to all languages meant in effect thoughtful comments on the functions of the parts of speech and 'various reflections upon the true foundations of the art of speaking' (1660: 3). What matters is that it marked a break with the prescriptivist studies of the day.

For the authors of the GGR, the purpose of speech was to communicate ideas that one has formed. The 'surface' forms of language are merely reflections of the modalities of thought. Since reason is universal, it follows that the rules for communicating one's thoughts must be the same despite the 'superficial' differences found among particular languages. In other words, reason sets rules for logic which are common to all people, and language is a reflection of these universal rules. Words, which are distinct and articulate sounds, are the symbols which represent these thoughts; if one does not understand what goes on in the mind, one cannot understand 'the different sorts of signification' of words. In any language, they believed, words are divided into two categories: those which signify the objects of our thoughts (nouns [substantival and adjectival], articles, pronouns, participles, prepositions, and adverbs), and those which signify the form and manner of our thoughts (verbs, conjunctions, and interjections). These are used to construct the surface manifestations of the operations of the mind as given in the *Logique*.

Since speech is a reflection of the operations of the mind, so too is grammar. The principal operation of the mind is judgment, or the formation of propositions. From this, then, the close link between grammar and judgment is established. Lancelot had already redressed the problem of the direct method with his earlier grammars; the GGR was then intended to supplement and improve his 'new method.' It can be seen to have two related objectives: the first, immediate goal was to promote an understanding of what language is. An understanding of the 'universal' aspects of language and workings of the mind would, in addition to improving the students' French, facilitate the acquisition of any foreign language by allowing them to focus on the similarities between the target language and French. Second, a superior grasp of language and its workings, both in theory and in practice, would enhance one's judgment and improve comprehension of Church writings and teachings.

3.4 Conclusions

If one takes the preface to the GGR at face value, Lancelot was not much more than a secretary transcribing the thoughts of the Great Arnauld, and in fact it has traditionally—though quite unfairly—been Arnauld who has been given most of the credit. It is true that the salient points of the grammar (at least to the modern reader) are, for the most part, attributable to Arnauld, for it is the emphasis on the proposition, the affirmative function of the verb, and the identification of speech with thought processes that show his philosophical stamp. The contribution of Lancelot, however, should by no means be underestimated. After all, it was he who decided to create a general grammar. Though not a truly original thinker, Lancelot was indeed well-versed in traditional grammatical thought, and had also become familiar with language from a more philosophical perspective. He knew which questions to investigate, how to organize the materials, and how to evaluate the information provided by Arnauld. Moreover, the greater part of the GGR consists of descriptions of the parts of speech—basic pedagogical information that may escape readers' attention as linguists. However, these parts of the book, undoubtedly provided by Lancelot, when explained in a clear manner, were just as important to the reader of 1660 as were the more sophisticated insights of Arnauld.

When the GGR was rediscovered in the 1960s, attention focused on Chomsky's analysis of the book as an example of Cartesianism applied to language, and what he considered to be the ancestors of 'deep' and 'surface structure.' The GGR was thus seen as a sort of primitive philosophical treatise on language. Since that time, however, as more information has come to light and a truer picture of the works of Port-Royal has developed, a more persuasive view is that the intent of the GGR was above all educational rather than philosophical. Lancelot wrote nothing but pedagogical works; the GGR was entirely his production, and there is no reason to assume that its purpose was otherwise. It was simply part of the Port-Royal plan to develop good Christians.

The other question to be considered is the relationship of the GGR to the NML and the *Logique*. The prevalent opinion seems to be that the GGR was meant to be a companion piece to the other works. However, this can be misleading, since the GGR is perfectly complete on its own, if one keeps in mind the true purpose and the target audience of the GGR. To a modern linguist who reads the GGR, there are indeed gaps, omissions, undeveloped arguments, and the like. But for the students of the 'petites-écoles' and for members of the general public, it was certainly as complete and every bit as detailed as was necessary.

When trying to account for the success of the GGR, there are several factors to consider, most of which are in fact nonlinguistic. To the modern linguist, the GGR is not really much to look at. In spite of rumblings of linguistic theory of the twentieth century, to the unsympathetic eye it is nothing more than a short book with an unrealistic objective—finding general principles of language with data from a handful of mostly European languages. From a seventeenth-century point of view, on the other hand, the situation was utterly different. The age of Louis XIV was one of great intellectual activity in which deep ideas were readily discussed and debated in the salons of Paris. Most previous books on language had been written in Latin, making them inaccessible by then to the educated public. Here was a book, written in clear French prose, that purported to be a guide to the study of all languages, which to the reader of the time was an exciting novelty. The fact that the Jansenists were involved in a bitter feud with the Jesuits also added mystique to the book and made it even more attractive. The other principal factor contributing to its success was an accident of timing. The publication of the book coincided with a relative calm in the struggle for 'correct' French. There was no longer the heated dispute over spelling reform or the question of the role of the French language. The doctrine of 'good usage' was well established, and it was now mostly a matter of observing and imitating. Prescriptivism was far from having died out, but the time was right for society and academicians to turn their attention to a new way of considering language, and Arnauld and Lancelot were there to fill that need. They took ideas from immediate predecessors who had developed a continuous line of thought, added some thoughts of their own, and published them. The Latin grammarians, already unknown to the great majority, were quickly forgotten, and their contributions were often attributed to Port-Royal by successive scholars. In summary, the GGR is an excellent example of being in the right place at the right time.

4. After Port-Royal

The GGR had a remarkable publishing history. Altogether it was published eighteen times, in six editions (including one for children), in four countries, and in an English translation. Its last printing was in 1846. With the success of the GGR, the general grammar movement slowly but steadily gained ground. The GGR was so highly regarded that for the next 150 years it was the model for many grammars in France; much of what was written was merely a rewording of, or a commentary on, their ideas. A modest list of grammars and other works that one could say were in the Port-Royal tradition includes Lamy (1675; the first rhetoric written in French rather than Latin), Régnier-Desmarais (1706; a failed attempt at a definitive French grammar by the Académie Française), Grimarest (1709; described by Brunot as 'a negation of all the principles proclaimed by Vaugelas'), Restaut (1730; which emphasized the didactic potential of general grammar), and Harris (1751; evidence of the success of the GGR in England). Duclos (1754), secretary of the Académie, and the Abbé Fromant (1756) added comments to update the GGR; these were thereafter often printed together with the GGR. Notions of sensationalist philosophy began to be combined with general grammar in Beauzée (1767), Dumarsais (1769), and Condillac (1775). Their interest in the relation between the individual and society, particularly the origins of language, signaled the beginning of a decline in the influence of traditional general grammar. For a while, then, several types of language study were carried on concurrently, for traditional rational grammar and old-fashioned prescriptivism continued to survive. Of the more traditional works, one should note Domergue (1796), Silvestre de Sacy (1799; regarded by Sainte-Beuve as the culmination of the work begun by the GGR), and finally the Abbé Sicard (1807; an attempt to apply general grammar to the teaching of deaf children).

In the early years of the nineteenth century, general grammar had exhausted itself, and interest turned to historical and comparative studies in the wake of the efforts of people such as Bopp, Rask, and Grimm. By the end of the nineteenth century, general grammar was a forgotten, often misunderstood, chapter in the history of grammatical studies.

Bibliography

Arnauld A, Lancelot C 1975 (1676) *General and Rational Grammar: The Port-Royal Grammar*. Mouton, The Hague (Ed. and transl. Rieux J, Rollin B)
Arnauld A, Nicole P 1964 (1683) *The Art of Thinking: Port-Royal Logic*. Bobbs-Merrill, Indianapolis, Indiana (Ed. and transl. Dickoff J, James P)
Carré I 1971 (1887) *Les pédagogues de Port-Royal*. Slatkine, Geneva
Chomsky N 1966 *Cartesian Linguistics*. Harper & Row, New York
Dominicy M 1984 *La Naissance de la grammaire moderne: Langage, logique, et philosophie à Port-Royal*. Mardaga, Brussels
Donzé R 1972 *La Grammaire générale et raisonée de Port-Royal*, 2nd edn. Francke, Bern
Harnois G 1928 *Les Théories du langage en France de 1660 à 1821*. Les Belles Lettres, Paris
Lancelot C 1653 *Nouvelle Méthode pour apprendre facilement et en peu de temps la langue latine*. Pierre le Petit, Paris
Padley G 1985 *Grammatical Theory in Western Europe, 1500–1700: Trends in Vernacular Grammar* I. Cambridge University Press, Cambridge
Sainte-Beuve C A 1954 (1840–60) *Port-Royal*, 3 vols. Gallimard, Paris
Trudeau D 1992 *Les Inventeurs du bon usage (1529–1647)*. Les Editions de Minuit, Paris

---

Universal Language Schemes and Seventeenth-Century Britain

Joseph L. Subbiondo

Seventeenth-century universal language schemes in Britain contribute much to an understanding of the history of linguistics and language philosophy—the advocates as well as the practitioners were engaged in a broad range of diverse issues.

In a seventeenth-century universal language, the words were expressed in a 'real character'—written (graphemic) and sound (phonemic) representations which defined as well as symbolized lexical referents. For example, in John Wilkins's (1614–72) universal or philosophical language, which he presented in exhaustive detail in his *Essay Towards a Real Character, and a Philosophical Language* (1668) and which is acknowledged by historians of linguistics as the standard of the genre, the letters and sounds of the words indicated the constituent elements of their referents. Thus, in his word for *dog* there were symbols to identify the species in general, indicating elements such as 'beast' and 'viviparous' (producing living young), and the species in particular indicating elements such as 'rapacious' (living on prey) and 'dog-kind.' Throughout his 'real character,' the letters and the sounds of Wilkins's artificial words denoted the constituent elements of their referents. Moreover, since these constituent elements were arranged in hierarchical order from the general to the specific, the listeners and readers of Wilkins's language arrived at the meanings and definitions of each word simultaneously. In *dog*, enough symbols indicating the distinctive features of 'dog' were added to the symbol 'beast.' On the other hand, the sounds and letters for *cat* are similar to *dog* in the general characteristics of 'beast,' 'viviparous,' and 'rapacious,' and dissimilar in the sounds and letters expressing the quality 'cat-like' instead of 'dog-like.'

Just as the letters and the sounds were arranged in a logical order within the work, the words in Wilkins's language were also arranged in a logical syntactic order. Thus the grammar which Wilkins designed for his universal language operated on two levels: on the surface structure level, it delineated the rules for the formation of words and sentences; and on the deep structure level, it connected the utterance to the conceptual structure of the mind. Universal grammarians referred to the surface structure grammar as 'particular' and to the deep structure grammar as 'universal,' 'natural,' 'philosophical,' and 'rational.' The terms were used synonymously.

The original idea of a universal or philosophical language, an artificial language based on a universal grammar and expressed in a 'real character,' has been credited by most contemporary scholars to René Descartes (1596–1650) who proposed it in a letter to Marin Mersenne (1588–1648) in 1629. It is difficult to overestimate the significance of Descartes's celebrated *Discourse on Method* (1637) to the seventeenth-century scientific revolution. Howell (1956: 343) rightly evaluated Descartes's *Discourse* as 'perhaps the most illuminating of all the books that have to be read if we are to understand the nature of the difference between the medieval and the modern world.' He summarized three major changes brought about by Descartes: first, he established experimentation rather than disputation as the means to find truth; second, he placed inquiry rather than communication as the central object of his system of logic; and third, he emphasized the practical rather than the speculative nature of science. The difference in method posed by Descartes on the one hand and by the classical tradition on the other has been cogently summarized recently by the physicist Stephen Hawking (1988: 15) 'The Aristotelian tradition [. . .] held that one could work out all the laws that govern the universe by pure thought: it was not necessary to check by observation.'

The Cartesian method, which was so essential to the scientific revolution, had a profound influence on linguistic inquiry in the seventeenth century. Drawing on the linguistic research of the vernacular grammarians of the fifteenth and sixteenth centuries, seventeenth-century grammarians developed their theories of language universals. In short, they no longer started their work with a conclusion, rather they discovered general and verifiable conclusions by framing hypotheses from the linguistic facts readily at hand.

Less than 25 years after the publication of Descartes's *Discourse*, Antoine Arnault (1612–95) and Claude Lancelot (ca.1615–95), Jansenist teachers at Port-Royal near Paris, published the *Grammaire générale et raisonnée* (1660). Two years later appeared Arnault and Pierre Nicole's (1625–95) Port-Royal *Logique*, mapping out the principles that underlie the Port-Royal *Grammar*. The *Grammar* was based on the assumption that a theory of grammar should conform to that of logic because the elements of language were essentially rational. Thus, Arnauld and Lancelot attempted to discover the principles common to all languages—a universal grammar based on the conceptual structure of the mind.

Although the arrangement of their work was rather traditional (the first part devoted to sounds and letters, and the second to parts of speech), Arnauld and Lancelot's grammar reflected their conviction that a finite number of grammatical rules produced an infinite number of expressions. For example they recognized the 'marvelous ability to compose an infinite variety of words out of 35 or 30 sounds' (p.27). Moreover, they based their word-classes on logical categories representing mental activities such as conception, judgment, and reasoning. In the *Grammar*, the 'subject' or 'concept' class referred to the objects of thought and included nouns, articles, pronouns, participles, prepositions, and adverbs; and the 'predicate' or 'judgment' class included verbs, conjunctions, and interjections.

The Port-Royal *Grammar* was not restricted to a study of Latin or of any one language; rather, it was concerned with explaining the underlying principles common to all languages. Throughout, its authors used examples drawn from a variety of languages; and, notably, the *Grammar* was written in French instead of Latin, as was still customary for that period.

It should not be surprising, given the relative similarity of goals and method of the Port-Royal *Grammar* and his own generative grammar, that Noam Chomsky should have enthusiastically called scholarly attention to the significance of the *Grammar*. In his *Cartesian Linguistics* (1966), Chomsky noted the Port-Royalists' preference for explanatory over descriptive grammar, for deep over surface structure of language, for universal over particular grammar, and for innate over acquired conceptual activities. Insisting that Descartes's work provided the initiative for this grammatical tradition, Chomsky argued that 'a Cartesian approach to language is developed, for the first time, with considerable insight' (Chomsky 1966: 33) in the Port-Royal *Grammar*.

The critics of Chomsky's *Cartesian Linguistics* attacked his interpretation of the history of seventeenth-century linguistics for giving too much credit to Descartes for advancing rational grammar in the seventeenth century. For example, Vivian Salmon (1969: 178) convincingly argued 'The essential features of the theory, however, were derived from a logical and grammatical tradition which had been developing, without any real interruption, since the early Middle Ages.' Salmon's review, as well as that of Lakoff (1969), sketched a rich and diverse panorama of grammarians who had connected theories of language with those of mind long before Descartes and who influenced seventeenth-century linguistics.

Francis Bacon (1587–1657) was the 'articulate spokesman of the inarticulate forces of his age' (Hill 1965: 87). He understood that his intellectual world was changing drastically, and he described that change in articulate prose. While it is not unfair to say that Bacon's ideas lacked the originality and the impact of Descartes's, his writings widely circulated the emerging ideas of the scientific movement. Like Descartes, Bacon's empirical method was based on observation, definition, classification, and experimentation. He championed the inductive method whereby one proceeded from the particular to the general, and he opposed the classical deductive method espoused by Aristotle and perpetuated until the end of the medieval period by the Modistae whereby one argued from the general to the particular. Purver's (1967: 235) summary of Bacon's philosophical vision is worth citing: she recognized that it '... cut away the whole existing system of natural sciences, and deliberately [began] the process of creating new sciences in which an organized body of related inductive knowledge, capable of continuous, unlimited development, could be built up, for the long term benefit of mankind.'

The 'New Philosophy,' promoted in Bacon's writings, was greatly responsible for making England the center of the scientific movement. As Bush (1945: 1) noted: 'In 1600 the educated Englishman's mind and world were more than half medieval; by 1660 they were more than half modern.' This scientific movement promoted the goals of universal language in several ways: first, it created an intellectual climate that made it acceptable for grammarians to apply the scientific method to the study of language; second, it changed the format of grammars from the Latin model of rigid paradigms to a more flexible format reflecting the empirical principles of observation, definition, classification, and experimentation; third, it produced so much new information that scientists no longer trusted the traditional languages to communicate it adequately; and fourth, it created an urgency to develop a philosophical system to classify the new information.

In 1642, an English translation of Jan Amos Comenius' (1592–1670) *Via Lucis* was circulated in England by Samuel Hartlib (ca.1600–62). Until Comenius, the celebrated Czech humanist and religious leader, a universal language was generally thought of as simply an international language, a kind of seventeenth-century Esperanto. Through his lectures in Britain in 1641 and through the visit of his disciple, Cyprian Kinner (fl.1650), to Britain in 1647, Comenius was largely responsible for establishing in Britain the notion that a universal language should be derived from a description and classification of reality. Kinner proposed a method to seventeenth-century British universal language theory which consisted of a system of radical symbols which would be shorthand definitions of their referents and a set of relational categories or syntactic structures which would be suited to logical universals (cf. Slaughter 1982: 126–40 for further details).

Seventeenth-century British intellectuals responded almost immediately to the universal language project: Oxford became the center of the movement as William Holder (1619–98), John Wallis (1616–1703), John Ray (1627–1705), Francis Willoughby (1635–72), Robert Hooke (1635–1703), Samuel Pepys (1633–1703), Seth Ward (1617–89), George Dalgarno (ca.1619–87), Francis Lodowyck (1619–94), and John Wilkins worked there to make the inspiration of Descartes, Bacon, and Comenius a reality.

While Wilkins's *Essay* represents the culmination of the movement, two of his contemporaries who greatly influenced his work were Lodowyck and Dalgarno. Lodowyck published two books on universal languages: *A Common Writing* (1647) and *The Groundwork of a New Perfect Language* (1652). Lodowyck never developed a universal language to the extent that Wilkins did, but he offered Wilkins a manageable system. Like Wilkins, Lodowyck (1647: 1) defined language as 'the expression or outward representation of the mind' which was understood because of the meanings of its words and the derivation of its syntax. He maintained that the rules of a universal language should be consistent and simple, and he believed that the graphemic symbols for a universal language should represent words and that additional symbols should indicate syntactic distinctions such as tense and mood.

In 1656, Dalgarno was working with Wilkins on a universal language. Since at first they agreed on their objectives, they worked jointly on the project. Soon, however, Dalgarno decided to work independently because he believed that Wilkins had become overly ambitious in his plan. In 1661, seven years prior to the publication of Wilkins's *Essay*, Dalgarno published his *Ars Signorum*, in which he presented his universal language (cf. Cram 1985). While there are similarities, as Shapiro (1969: 213) pointed out, 'In the disputes over which system was superior, the verdict in nearly every instance went to Wilkins.'

Like Comenius, Wilkins was interested in producing more than an international language: he sought to invent a universal language which would 'express our conception by marks which would signify things, and not words' and whereby 'to everything and notion there were assigned a distinct mark' (1668: 21). Wilkins's *Essay* consisted of charts in which he classified, in comprehensive detail, the inventory of seventeenth-century knowledge. He described this section of his work which included the new information brought about by the scientific revolution as a 'regular enumeration and description of such things and notions, as are to be known' (Wilkins 1668: 297). Following this lengthy section, he devoted the first nine chapters of Part III of his *Essay* to an explicit treatment of universal grammar.

At the outset, Wilkins distinguished universal from particular grammar: the former 'which may likewise be styled philosophical, rational, and universal' and which included 'all such grounds and rules, as do naturally and necessarily belong to the philosophy of letters and speech in general' (Wilkins 1668: 297); and the latter which comprised 'the rules which are proper and peculiar to any one language in particular; as about the inflection of words, and the government of cases' (ibid.). Wilkins pointed out that a universal grammar would be the basis for his philosophical language because that language would be a perfect language capable of expressing all that language could express and free of the imperfections which had crept into existing natural languages. He claimed to be one of the earliest grammarians, if not the first, to mount an elaborate analysis of universal grammar.

While he acknowledged the works of Julius Caesar Scaliger (1484–1558), Francis Bacon, Tommaso Campanella (1568–1659), and Gerhard Jan Vossius (1577–1649), he had reservations regarding the validity of their work. He wrote: 'But to me it seems, that all these authors in some measure (though some more than others) were so far prejudiced by the common theory of the language they were acquainted with, that they did not sufficiently abstract their rules according to nature' (Wilkins 1668: 297–98). Although Wilkins conceded that such prejudices were almost unavoidable, he believed that his universal grammar would still be 'less erroneous in this respect than the rest' (1668: 298).

The grammar consisted primarily of a word class analysis 'according to which names of things may be varied in their acceptions; being made either derivative nouns, or adverbs; together with their several inflections and compositions; which may be styled etymology' (ibid.); and of syntax, a two-page treatment, which is the 'proper union of right construction of these into prepositions of sentences' (ibid.). For the formation of his real character, he added a section on phonology which was the study of 'the most convenient marks or sounds for the expression of such names or words' (p.298). In methodology, Wilkins set up a near binary approach for word classification. For example, he distinguished inflected word-classes by dividing them into integrals and particles. Integrals were words which 'signify some entire thing or notion' (ibid.), and particles were 'less principal words, which may be said to cosignify, serving to circumstantiate and modify those integral words . . .' (p.304). In his integral word class, Wilkins included nouns, adjectives, verbs, and adverbs in the following near binary relationship: integrals were either nouns or derived adverbs; if nouns, then they were either substantives or adjectives; if adverbs, then they were neuter, active, or passive. By neuter, Wilkins meant those words signifying 'the essence of a thing' (p.298); and by active and passive, he was referring to those words related to 'the doing or suffering of a thing' (ibid.). Here was Wilkins's most innovative departure from the Greco–Roman word-classification: he grouped nouns and verbs together on the grounds that they were interrelated.

In his study of nouns, as in all his word classes, Wilkins established formal and semantic criteria. He defined the noun formally as anything conjoined with a verb which constituted a complete sentence, and he defined a noun semantically as a word 'which men do agree upon for the names and appelation of things' (p.298). In his treatment of the noun, Wilkins revealed his understanding of the productive principle of universal grammar. In his definition of a proper substantive, he maintained that proper nouns are 'individual and infinite; and therefore such proper names as pertain each to one only, should be esteemed as so many articulate voices, to be expressed by such particular vowels and consonants as will make such respective sounds' (p.299). This statement resembles that of Lancelot and Arnauld quoted previously.

Wilkins believed that even though every natural language varied in the lexical arrangement of its word classes, each language was universally governed by rules of derivation which determined, for example, how nouns were to be transformed into adverbs, verbs into adjectives, and adverbs into adjectives. In binding these four word classes together in a derivational relationship, Wilkins was dramatically changing the system of the 'common grammarians' (p.303). He was viewing the parts of speech as connected in a way that no other grammarian in the seventeenth century had used to explain the underlying structure of language.

Wilkins explained the derivation in the verb class by providing an excellent example of how the derivational relationship among all word classes operated: 'a verb [. . .] ought to have no distinct place amongst integrals in a philosophical grammar because it is really no other than an adjective and the copula . . .

affixed to it or contained in it' (p.303). To demonstrate, Wilkins offered 'he heats' was really a derivation of 'he is heating,' and then he suggested that the following were also derivations: 'being heated,' 'hot,' 'heated,' 'hotly,' 'heatingly,' 'heatedly,' and 'hotness.'

Wilkins believed that, with the exception of the copula, particles were generally occasional because they often substituted for integrals: 'Amongst those particles which are not essential and perpetual, but used according to occasion, some are styled substitutive because they supply the room either of some integral word, as pronouns, or of some sentence or of complex part of it, as interjections' (p.305). He then placed the pronouns, interjections, prepositions, conjunctions, and articles into his particle class; his analysis of these word classes was fairly traditional. For example, in discussing the pronoun, he set up a paradigm according to number and person. However his lengthy, and amusing, discussion of the interjection was certainly original. Wilkins defined an interjection as a substitute for a sentence which was 'expressed by such rude incondite sounds, several of which are common with us to brute creatures' (p.308). He further classified interjections as solitary or social depending on whether the speaker is alone or with others; and according to emotions such as mirth, love, hate, and desire. Moreover, Wilkins's analysis of transcendental particles demonstrated an understanding of morphology which was rare for his day. For example, Wilkins took the particle *like* and pointed out that if it was 'affixed to any word, doth denote a varying of the sense of that word' (p.304). He also showed that '-ish' when added to nouns produced adjectives such as 'brutish,' 'devilish,' and 'waspish.'

Wilkins was the first English grammarian to work out a comprehensive and manageable universal grammar. It is also safe to assume that Wilkins did not plagiarize his French colleagues because the publication dates of his work and theirs are too close to suggest that each may have copied the other.

No other linguistic project engaged and influenced more scholars from as many countries for as many years as the seventeenth-century universal language movement. No other movement was as characteristic of its age: it was initiated, formulated, and abandoned during the seventeenth century (see Salmon 1975). The invention of a universal and a philosophical language was an extensive undertaking so broad in its goals, international in its development, and interdisciplinary in its approach, that it attracted a diverse group of prominent scholars—grammarians, philosophers, scientists, and theologians—who were intensely fascinated with the interplay of language, thought, and communication. Moreover, the movement enjoyed the advocacy and financial support of statespersons and merchants who recognized the diplomatic and commercial benefits of a universal language. London and Oxford may have been the geographical centers of the movement; however, intellectuals throughout the European continent contributed to this unique project.

Bibliography

Bush D 1945 *English Literature in the Earlier Seventeenth Century 1600–1660*. Clarendon Press, Oxford (2nd rev. edn., 1962)

Chomsky N 1966 *Cartesian Linguistics: A Chapter in the History of Rationalist Thought*. Harper & Row, New York

Cram D 1985 Language universals and 17th-century universal language schemes. In: Dutz K D, Kaczmarek L (eds.) *Rekonstruktion und Interpretation*. Narr, Tübingen

Hawking S W 1988 *A Brief History of Time: From the Big Bang to Black Holes*. Bantam, London

Hill C 1965 *Intellectual Origins of the English Revolution*. Clarendon Press, Oxford

Howell W S 1956 *Logic and Rhetoric in England, 1500–1700*. Princeton University Press, Princeton, New Jersey

Lakoff R T 1969 Review of *Grammaire générale and raisonnée*. *Language* **45**: 342–64

Purver M 1967 *The Royal Society: Concept and Creation*. MIT Press, Cambridge, Massachusetts

Robins R H 1967 *A Short History of Linguistics*. Longman, London (3rd edn. 1990)

Salmon V 1969 Pre-Cartesian linguistics (on the occasion of Noam Chomsky's *Cartesian linguistics*). *Journal of Linguistics* **5**: 165–87

Salmon V 1972 *The Works of Francis Lodwick: A Study of His Writings in the Intellectual Context of the Seventeenth Century*. Longman, London

Salmon V 1975 Philosophical grammar in John Wilkins's essay. *Canadian Journal of Linguistics* **20**: 131–60

Salmon V 1979 *The Study of Language in 17th-century England*. Benjamins, Amsterdam (2nd edn. 1988)

Shapiro B J 1969 *John Wilkins, 1614–1672: An Intellectual Biography*. University of California Press, Berkeley, California

Slaughter M M 1982 *Universal Languages and Scientific Taxonomy in the Seventeenth Century*. Cambridge University Press, Cambridge

Subbiondo J L (ed.) 1992 *John Wilkins and 17th-century British Linguistics*. Benjamins, Amsterdam

Wilkins J 1668 *An Essay Towards a Real Character, and a Philosophical Language*. Gellibrand & Martin, London

Early Historical and Comparative Studies in Scandinavia, the Low Countries, and German-speaking Lands

Kurt R. Jankowsky

The origin of language studies and the search for linguistic affiliation have many roots. Languages were studied quite insightfully—with results that thoroughly affect linguistic thought even in the late twentieth century—both in Greek and Roman antiquity, and probably also long before that time in other cultures of which only limited knowledge is available. Scientific language study, on the other hand, is of a comparatively recent vintage. While a large number of sporadic attempts are known to have been made throughout the intervening centuries between classical antiquity and the beginning of the eighteenth century, a decisive event was the proclamation of Sir William Jones (1746–94), made in 1786 and published two years later, which swiftly captured the minds of scholars in many parts of Europe: a certain number of languages, later on to become known as Indo-European, are so similar in grammatical structure that it must be assumed that they had descended from the same source language. Sir William Jones's hypothesis, for which at the time neither he himself nor any of his contemporaries could provide much empirical linguistic evidence, set in motion an unprecedented amount of activities, all geared to substantiate the correctness of what he had hypothesized. His stature as an Orientalist ensured that his voice was widely heard in Europe. But it required Friedrich Schlegel, Franz Bopp, and others to implement his suggestions (see *History of Historical Linguistics*; *History of Comparative Linguistics*). Jones's observation, however, was not original with him (see *Discovery of Sanskrit by Europeans*) since numerous endeavors made by others before his time led to statements quite similar to his. Of the many earlier instances which could be cited as examples for still somewhat rudimentary language comparisons or historical comparative language studies, only those representatives are mentioned below who were especially instrumental in determining the ensuing course of linguistics.

In 1555 the Swiss-German Conrad Gessner (1516–65) published what was to become recognized as a first major attempt at scientific language comparison. In his book *Mithridates: De differentiis linguarum, tum veterum, tum quae hodie apud diversas nationes in toto orbe terrarum in usu sunt* (*Mithridates: On the Differences of Ancient Languages as well as those that are in use today in the Different Countries of the Entire World*), Gessner compared 22 languages by using the Lord's Prayer as his language sample, a procedure still employed, much later, by his eighteenth-century successor Johann Christoph Adelung (1732–1806).

Gessner was not a language specialist in the modern sense. His field of interest was as wide as to incorporate almost all branches of science practiced at his time. Hence, his achievements in the area of language study were rather general. However, Gessner's work is important in many respects, especially because of an idea which he expressed in the introduction dedicated to the Englishman Johannes Balaeus. Languages, he says, are indeed very different in the way they express thought. That difference in grammatical structure indicates the extent to which languages are related. Precise knowledge of how different languages are is essential: 'In my opinion, it belongs to what an educated and intellectually gifted individual should study, namely, to come to know the variability of speech and of the languages.' His remarks also throw light on possibly the strongest motivation for scholars to embark on the attempt to unravel the secrets of language: the desire to probe into the development of thought and its relationship to language. This same motivation was very forcefully expressed by Gottfried Wilhelm Leibniz (1646–1716). Statements like the following, contained in his *New Essays Concerning Human Understanding* (1704), characterize his general attitude in the matter:

> I am truly convinced that languages are the best mirrors of the human mind, and that a precise analysis of the meaning of words better than anything else would show how the mind operates.
>
> (Gerhardt 1875–90, vol. 3: 313; my translation)

Leibniz, in keeping with this view, admonished his countrymen to improve thought by improving their native language. He furthermore set up strict guidelines for the work of the language investigator: 'The study of languages must not be conducted according to any other principles but those of the exact sciences.' He envisioned three stages in such a scientific procedure. The first stage, and the only possible point of departure, would have to be the thorough study of 'the modern languages which are within our reach.' Once those have been sufficiently explored, they would have to be compared 'with one another, to discover their differences and affinities.' In the third and last stage, languages should be compared with 'those which have preceded them in former ages, in order to show their filiation and their origin' (cf. Jankowsky 1972: 21). While neither Leibniz nor anyone else at that time did advance to the implementation of those guidelines, his work provided a framework for subsequent investigation which eventually led to the achievements of the nineteenth-century linguists.

In 1686 the Swede Andreas Jäger (d.1730) published a paper in Wittenberg entitled *De Lingua Vetustissima Europae, Scytho–Celtica et Gothica* (*On the Oldest Language of Europe, Scytho–Celtic and Gothic*). It contained a number of surprisingly accurate observations on how languages are related. In describing this relationship he used terms like 'ancestral language,' 'mother language,' and 'daughter languages,' thus demonstrating that he had gained at least a general understanding of the notion of genetic relationship. Like August Schleicher (1821–68) almost 200 years later, Jäger discussed the need to consider various stages of language development in terms of infancy, youth, manhood, and death. He used terms reminiscent of the family tree concept, speaking of dialects in terms of Latin *rami* (branches) with surprising consistency (see Metcalf 1974: 236).

Justus Georg Schottelius (1612–76), for his part, fought valiantly to secure for his native German a place comparable to that traditionally accorded to the study of the three 'sacred' languages, Hebrew, Greek, and Latin. Ever since the Venerable Bede's (672/73–735) emphatic pronouncement those three languages were considered to 'greatly excel in the whole world' (Metcalf 1974: 238). The obstacles Schottelius had to overcome were formidable. Vernacular languages such as German were hardly deemed worthy of any scholarly pursuit. Their status was considered to be not even remotely comparable to that of Hebrew, which continued to be widely regarded as the holiest and also the oldest language from which all other languages were derived. It was Leibniz who was to break with that cherished and hitherto largely unchallenged belief, thus clearing the way for meaningful historical and comparative language studies. Schottelius excelled in amassing linguistic materials which many of his successors—including Leibniz, who frequently referred to him (cf. Schulenburg 1973: 127)—found useful. The Orientalist Hiob Ludolf (1624–1704), upon whom Leibniz relied heavily in matters of the German language (as well as a variety of 'exotic' languages), was another beneficiary of Schottelius's linguistic endeavors. But both Leibniz and Ludolf outdistanced Schottelius considerably in the thoroughness of their linguistic acumen. Ludolf's ideas as to what language comparison entails are substantive and uncommonly precise:

> To establish [a genealogical] relationship between two languages, it is necessary that they not only share some words, but also that their grammatical structure be identical to a substantial extent, as is known from the case of the Oriental languages.
>
> (Quoted after Jankowsky 1972: 23–24)

Ludolf, founder of Ethiopian language study in Europe, practiced what he preached in numerous investigations that involved Ethiopian, Amharic, Hebrew, also Latin (cf. Schulenburg, passim) and to some extent even the language of the Gypsies.

Ever since the Reformation and Johann Reuchlin's (1455–1522) works on Hebrew, *De rudimentis hebraicis* (First Steps in Hebrew) (1506), and *De accentibus, et orthographia, hebraeorum libri tres* (*Three Books on the Accentuation and Orthography of Hebrew*) (1518), discussions on Hebrew became more frequent and were obviously much less inhibited by the dogmatic beliefs that had ruled the minds of the scholars for many centuries. The book on *Richtige Anführung zur hebräischen Sprache* (1702) by Johann Heinrich Michaelis (1668–1738) is just one indication of a gradually developing new trend.

Important insights regarding language affiliation are due to Christian Jacob Kraus (1753–1807), a Königsberg economist by profession and a philosopher and linguist by avocation, who focused attention on the necessity of exploring the sound side of language in much greater detail than had been done so far. He insisted, for instance, on the importance of determining the phonetic value of speech sounds (see Kaltz 1985). But he also emphasized the need to explore more thoroughly the grammatical structure and set up criteria for interpreting the similarity or identity of linguistic forms. His term '*philosophische Universal-Linguistik*' comes close to what 'comparative linguistics' stands for today. Kraus kept well informed about the results of language studies in his native Germany as well as in other countries. Thus he expressed high hopes that the exploration of the grammatical structure of Sanskrit by the 'learned society at Calcutta' will inspire other researchers to continue work along similar lines. Kraus is a forerunner par excellence of comparative–historical linguistics.

In Scandinavian countries intensive language studies began about as early as in Germany. North Germanic philology was established and developed by a host of Danish, Icelandic, Swedish, and Norwegian scholars. As the most prominent of them—and in all probability as the pioneers of North Germanic philology—the following scholars have to be mentioned: the Dane Stephanus Johannis Stephanius (1599–1650), famous for his edition of *Saxo Grammaticus: Gesta Danorum* (1644), gained recognition for his efforts to increase the precision of historical description. Ole Worm (1588–1654), another Dane, was noted for his several books on Old Germanic literature, for instance, *Runer seu Danica Literatura antiquissima* (1636); a booklet (1641) on the Golden Horn of Gallehus, discovered in 1639, containing the oldest extant Germanic alliterative verse (Ik Hlevagastir Holtingar horna tawido); and *Danicorum monumentorum libri VI* (1643), for a long time the most important book on the Germanic runes. Like Stephanius, Worm focused on the exploration of the riches of ancient Scandinavian literature. The Icelander Runolf Jonsson (d.1654), better known as Runolphus Jonas, is said to have written the first Icelandic grammar, *Recentissima antiquissimae linguae septentrionalis incunabula, id est Grammaticae Islandicae Rudimenta Nunc primum adornari coepta et edita* (*The Most Recent Incunabula of the Most Ancient Northern Language, that is, an Introduction to the Icelandic Grammar, now for the first time arranged and edited*) (1651). His intensive studies of the three 'holy languages' as well as modern languages such as German, English, and the Romance languages, inspired him to apply the insights gained to his native tongue and for an historical treatment of the Scandinavian languages in general. Johannes Bureus (1568–1652), credited with having founded the study of Old Germanic archaeology in his native Sweden, wrote an evaluation based on his extensive collection of Runic inscriptions (on stone) and his meticulous description of his findings (1599). He furthered language studies significantly by being the first to describe an old Germanic language with primary emphasis on its grammar. Peder Hansen Resen or Petrus Resenius (1625–88) provided the first edition of Snorri Sturleson's (1179–1241) *Edda*, both of the *Poetic* or *Older Edda* and of the *Prosaic* or *Younger Edda*, in 1665. The Older Edda contains approximately 30 songs dealing with stories about Germanic gods and heroes. It originated in Iceland between 800 and 1000 AD. The Younger Edda dates from around 1220 and was written as a handbook for the younger skalds to gain experience in the use of *kenningars*, the metaphorical paraphrase of a concept by a composite expression, and also learn about other essential aspects of poetic art. The edition, because of its comprehensiveness, proved to be a very important source material not only for Scandinavian scholars, but also for scholars from all over Europe who were interested in Old Germanic studies. More than through his original research Resenius exerted extraordinary influence by searching out segments of the ancient mythological writings, discovered by other scholars, placing them into their appropriate context and seeing to it that they were published. Another important contribution of his was the edition of the Icelandic dictionary (*Lexicon Islandicum, sive gothicae runae vel linguae septentrionalis dictionarium*, Havniae, 1683) which his countryman Gudmundur Andresson (ca.1615–54) had compiled.

The Swedish captain Philipp Johann von Strahlenberg (1676–1747), prisoner of war for several years in Siberia, had the good fortune of being able to utilize his time to collect materials on various languages which he had encountered during his years of imprisonment, especially on Altaic languages. He published his findings in a work entitled *Das nord- und östliche Theil von Europa und Asia* (Stockholm 1730).

For their efforts in exploring their native Danish language at least to some extent according to historical principles two additional scholars must be mentioned. The first is the Danish scholar Peder Syv (1631–1702). He gained importance by being one of the first to have written a Danish grammar (1663), reprinted by Henrik Bertelsen in *Danske Grammatikere I–VI* (Copenhagen 1915–29). The second is Jens Pedersen Høysgaard (1698–1773) whose work on *Accentuered og raisonnered grammatica* (1747) proved to be an essential link in the development of intensified historical studies. Høysgaard's study provided most accurate information on the language of his time, especially on matters of accent and quantity.

Of extraordinary importance is the work of Franciscus Junius (1589–1677), born in Germany of a French father and a Dutch mother, who spent 30 years of his life in England and subsequently settled in Holland. He is rightly credited with having introduced Gothic into the Germanic family of languages by his edition of the *Codex Argenteus* (1665). He had received the texts from his brother-in-law Isaak Vossius (1618–89), a great collector of manuscripts (a collection later on purchased by Leiden University and known as *Codices Vossiani*). Comparative studies involving Gothic and other European languages followed at short intervals. Andreas Jäger's *De Lingua Vetustissima Europae, Scytho–Celtica et Gothica* (1686), mentioned above, was soon succeeded by numerous comparable publications. The Dutch scholar Lambert ten Kate (1674–1731) with his work on *Gemeenschap tussen de Gottische Spraeke en de Nederduytsche* (*The Relationship between the Gothic and the Dutch Languages*) (1710), created a milestone in comparative studies. Among other discoveries he found out that the stem vowels of the strong verbs are far from being entirely irregular, but follow, instead, regular patterns of deviation which are comparable in all Germanic languages. Another important contribution was made by the Swede Johan Ihre (1707–80) with his main work *Glossarium suiogothicum* (1769). He investigated comparatively the vocabularies of various Germanic languages and recognized their relationship with Moesogothic, 'the mother of all the other [Germanic languages].' He was also aware that certain relationships exist between the Germanic languages and, for instance, Greek, Latin, and Persian. Ihre also demonstrated familiarity with what later on was more comprehensively described as the laws of sound shifts.

The framework for comparative and historical linguistics created at the beginning of the nineteenth century by scholars like Franz Bopp, Rasmus Rask, and Jacob Grimm was, therefore, by no means without influential antecedents; on the contrary, there is sufficient evidence to prove that these linguists have greatly benefited from the labors—and the insights—of their seventeenth- and eighteenth-century predecessors. The Indo-European hypothesis that unites most European languages with languages as far away as India provided a focus which led to more and more precision in the description and analysis of languages and their history.

Bibliography

Adelung J C 1806–17 *Mithridates oder allgemeine Sprachenkunde*, 4 vols. Voss, Berlin (Vols. 2–4 ed. by Vater J S). Repr. 1970 Olms, Hildesheim

Andresson G (=Andreae G) 1683 *Lexicon Islandicum, sive gothicae runae vel linguae septentrionalis dictionarium, in lucem productum per P J Resenium*. Gerhard, Copenhagen

Bertelsen H (ed.) 1915–29 *Danske Grammatikere fra midten af det syttende til midten af det attende aarhundrede*, 6 vols. Byldendal, Copenhagen

Bureus J 1624 *Monumenta sveo-gothica hactenus exsculpta*. Eskil Mattsson, Uppsala

Bureus J 1636 *Specimen primariae lingvae Scantzianae, continens declinationes nominum, adjectivorum et substantivorum, ut et sintaxin eorum in tabula*. Stockholm

Diderichsen P 1974 The foundation of comparative linguistics: Revolution or continuation? In: Hymes D (ed.) *Studies in the History of Linguistics: Traditions and Paradigms*. Indiana University Press, Bloomington, Indiana

Droixhe D 1978 *La linguistique et l'appel de l'histoire (1600–1800)*. Droz, Geneva

Gerhardt C I (ed.) 1875–90 *Die philosophischen Schriften von Gottfried Wilhelm Leibniz*, 7 vols. Weidmann, Berlin. Repr. 1960–61 Olms, Hildesheim

Gessner C 1555 *Mithridates. De differentiis linguarum tum veterum tum quae hodie apud diversas nationes in toto orbe terrarum in usu sunt*. Excudebat Froschoverus, Zürich. Repr. 1971 Microéditions Hachette, Paris

Gyarmathi S 1983 [1799] *Grammatical Proof of the Affinity of the Hungarian Language with Languages of Fennic Origin*. Benjamins, Amsterdam (Transl. by Hanzeli V E)

Høysgaard J P 1747 *Accentuered og raisonnered grammatica, som viset det danske sprog i sin naturlige skikkelse, saa velsom dets rime-konst og vers-regler*. Groth, Copenhagen

Ihre J 1769 *Glossarium suiogothicum*. Edmann, Uppsala

Jäger A 1686 *De Lingua Vetustissima Europae, Scytho–Celtica et Gothica*. Schrödter, Wittenberg

Jankowsky K R 1972 *The Neogrammarians: A Re-evaluation of Their Place in the Development of Linguistic Science*. Mouton, The Hague

Jonas R 1651 *Recentissima antiquissimae linguae septentrionalis incunabula, id est grammaticae Islandicae rudimenta nunc primum edita*. Hakius, Hafniae

Jongeneelen G H 1992 Lambert ten Kate and the origin of 19th-century historical linguistics. In: Noordegraaf J, Versteegh K, Koerner K (eds.) *The History of Linguistics in the Low Countries*. Benjamins, Amsterdam

Junius F (ed.) 1665 *Gothicum glossarium, quo pleraque Argentei codicis vocabula explicantur, atque ex linguis cognatis illustrantur. Praemittuntur ei gothicum, runicum, anglosaxoricum, aliaque alphabeta*. Typis Junianis, Dordrecht

Kaltz B 1985 'Christian Jacob Kraus' Review of 'Linguarum totius orbis vocabularia comparativa' Pallas P S (ed.) (St Petersburg, 1787). *Historiographia Linguistica* **12(1/2)**: 229–60

Kate L ten 1710 *Gemeenschap tussen de Gottische Spraeke en de Nederduytsche*. Jan Riewertsz, Amsterdam

Kate L ten 1723 *Aenleiding tot de Kennisse van het verhevene Deel der Nederduitsche Sprake*, 2 vols. R & G Wetstein, Amsterdam

Kraus C J, Review of P S Pallas, ed. *Vergleichendes Glossarium aller Sprachen und Mundarten* (St Petersburg, 1787). *Allgemeine Literatur-Zeitung* **4**: 235–37, 1–30 (largely transl. in Kaltz 1985)

Ludolf H 1681 *Grammatica aethiopica*. Zunner, Frankfurt (New edn. by Brentjes B, Gallus K 1986 Martin-Luther-Universität, Halle)

Metcalf G J 1974 The Indo-European hypothesis in the sixteenth and seventeenth centuries. In: Hymes D (ed.) *Studies in the History of Linguistics: Traditions and Paradigms*. Indiana University Press, Bloomington, Indiana

Metcalf G J 1980 Theodor Bibliander (1504–64) and the Languages of Japheth's Progeny. *Historiographia Linguistica* **7(3)**: 323–33

Michaelis J H 1702 *Erleichterte hebräische Grammatica, oder, Richtige Anführung zur hebräischen Sprache*. Zeitler, Halle

Raumer R von 1870 *Geschichte der Germanischen Philologie vorzugsweise in Deutschland*. Oldenbourg, Munich

Resen P H (=Resenius P) 1665 *Edda Islandorum ann Chr. MCCXV Islandice conscripta per Snorronem Sturlae Islandiae nomophylacem nunc primum Islandice Danice et Latine ex antiquis codicibus mss. bibliothecae regis et aliorum in lucem prodit opera et studio Petri Johannis Resenii*. Typis Gödiani, Hafniae

Resen P H 1683 *Lexicon Islandicum, sive gothicae runae vel linguae septentrionalis dictionarium, in lucem productum per P J Resenium*. Gerhard, Copenhagen

Reuchlin J 1506 *De rudimentis hebraicis libri tres*. Anshelm, Pforzheim. Repr. 1974 Olms, Hildesheim

Reuchlin J 1518 *De accentibus, et orthographia, linguae hebraicae libri tres*. Hagenoae, in aedibus Thomae Anshelmi Badensis

Saxo Grammaticus 1644 *Saxonis Grammatici Historiae danicae libri XVI. Stephanus Iohannis Stephanius summo studio recognovit*. Typis Moltkenii, Sora

Schottelius J G 1663 *Ausführliche Arbeit von der Deutschen Haupt-Sprache*. Zilligern, Braunschweig

Schulenburg S von der 1973 *Leibniz als Sprachforscher*. Klostermann, Frankfurt

Strahlenberg P J T von 1730 *Das nord- und östliche Theil von Europa und Asia*. Stockholm (Transl. 1738 as *An Historicogeographical Description of the North and Eastern Parts of Europe and Asia, but more Particularly of Russia, Siberia and Great Tartary*. Innys & Manby, London. Repr. 1970 Arno Press, New York)

Syv P 1663 *Nogle betenkninger om det cimbriske sprog*. Copenhagen

Worm O 1636 *Runer seu Danica Literatura antiquissima*. Moltke, Copenhagen

Worm O 1643 *Danicorum monumentorum libri sex: E spissis antiquitatum tenebris et in Dania ac Norvegia extantibus ruderibus eruti ab Olao Worm*. Moltke, Copenhagen

Beginnings of Comparative and Historical Studies in Britain

Michael K. C. MacMahon

The study of Greek and Latin flourished in Britain from the Middle Ages onwards. The study of oriental languages such as Hebrew, Arabic, and Persian began rather later, and derived from the efforts of scholars like William Bedwell (ca.1561–1632), Abraham Wheelocke (1593–1653), Edward Pococke (1604–91), and Thomas Hyde (1636–1703). Grammars were produced, but the main emphasis was on the elucidation of texts, especially religious or literary ones.

The field of Celtic philology did not achieve prominence until the early eighteenth century, with the publication by Edward Lhuyd (1660–1709) of his major descriptive study of the Celtic languages, the *Archæologia Britannica* (1707).

It was an interest in Old English which was to produce a new, and ultimately, fruitful development in linguistic scholarship in Britain. It began in the sixteenth century, but the significant work was not published until after about the middle of the seventeenth century. Not only Old English, but also, eventually, Gothic, Old Norse, and, occasionally, Old Frisian were described; no formal comparative analyses were made of them, however. For this one had to wait until the nineteenth century.

The impetus for the study of Old English came partly from the need to make sense of the language of England's oldest legal and historical documents, and partly from the desire, for purely religious reasons, to uncover evidence to show that England in earlier times had espoused a form of Christianity more in line with that of the Protestant reformers than of the Church of Rome. The result was work of variable character and quality.

Antiquarians such as Laurence Nowell (d.1576) and John Joscelyn (1529–1603) made copies of Anglo–Saxon MSS, some of which found their way into print; the MSS of the *Anglo–Saxon Chronicle* were of particular interest for the information they provided about the early history of England (Lutz 1982). John Selden's (1584–1654) work on the laws and customs of the Anglo–Saxons, Norsemen, and Normans (1610), however, suffers from the lack of adequate control over the linguistic materials he consulted. And William Camden (1551–1623), whilst researching his famous *Britannia* (1586), had had to piece together, as best he could, a knowledge of Old English.

The work of the antiquarian, lawyer, and parliamentarian, Sir Henry Spelman (1564–1641), led to the founding of the first lectureship in the 'Saxon language and our ancient British churches' in Britain, at Cambridge University, in 1635, and, indirectly, to other important developments. Spelman, having worked on the early charters of England, had recognized, like Selden before him, the need for basic research to be done into the language of the Anglo–Saxons. As a result of being appointed to the lectureship, Abraham Wheelocke (1593–1653), the Arabist turned Anglo–Saxonist, was enabled to continue working on Anglo–Saxon MSS; in 1643 he published his *Historiæ Ecclesiasticæ Gentis Anglorum*, containing King Alfred's translation of Boethius, together with an English translation of the *Anglo–Saxon Chronicle*. On his death, the endowment passed to Oxford University to allow William Somner (1598–1669) to complete his Anglo–Saxon dictionary, *Dictionarium Saxonico-Latino-Anglicum* (1659), the first to be published in Britain.

Five years later, the German–Dutch linguist, Francis Junius (1589–1677)—see also Jankowsky's contribution to the present volume—who spent altogether nearly 30 years of his life in Britain, published his *Gothicum Glossarium* in 1664/65. (In 1655, his edition of the Cædmon MS of biblical poetry had appeared, albeit, like the *Gothicum Glossarium*, in the Netherlands.) From then, until the turn of the eighteenth century, the pace of older Germanic studies in Britain quickened.

At Oxford, younger scholars such as William Nicolson (1655–1727), George Hickes (1642–1715), and Edward Thwaites (1667–1711) continued the style of Anglo–Saxon scholarship exemplified by Junius. Nicolson published, in 1685, on the runic inscriptions at Bewcastle and Bridekirk, having first mastered German and the Scandinavian languages at Leipzig University—the first of several British philologists over the next two centuries to study there. Most notably, George Hickes published in 1689 his *Institutiones Grammaticae Anglo–Saxonicae, et Moeso–Gothicae*, which included, posthumously, a dictionary and grammar of Old Icelandic written by Runólfur Jónsson (d.1654). Hickes subsequently revised and expanded the work into *Linguarum Veterum Septentrionalium Thesauri Grammatico-Critici et Archaeologici* (1703).

The latter was the first major exposition in Britain of the structure of not only Old English, but also Gothic, Old Frisian, and Old Icelandic. Each language was treated separately, and apart from the occasional remark on correspondences (e.g., between *s* and *r* in Gothic *weis* and OFris *wir* or *wer*), Hickes did not attempt to draw up any sets of rules to account formally for the connections between the languages.

The *Thesauri* would not have been possible without the assistance and encouragement of other scholars, such as the paleographer Humfrey Wanley (1672–1726) and Edward Thwaites (Murphy 1981). Indeed, it was the role of Queen's College, Oxford (where Hickes was based) as the focal point for Anglo–Saxon studies from the 1670s onwards that led to other significant advances being made. William Nicolson was appointed to a lectureship there in the subject; Edmund Gibson (1669–1748) published his edition of the *Anglo–Saxon Chronicle* in 1692; Edward Thwaites gathered round him a group of students, including William Elstob (1673–1715) and his sister Elizabeth Elstob (1683–1756), who published in the fields of, *inter alia*, Anglo–Saxon numismatics and grammar respectively.

By the first decade of the eighteenth century, the study of Old English (and the associated Germanic languages) continued to act as a means of understanding the history and culture of the Anglo–Saxons; it had also, though, by now acquired the status of a linguistic discipline in its own right. It did not, however, lead to any insights into the pre-history of the languages nor to any hypothesizing about common origins, despite its having developed most significantly during a period, from the mid-seventeenth century onwards, when there was intense interest by linguists and philosophers alike in questions of universal languages and philosophical grammars.

Bibliography

Droixhe D 1978 *La Linguistique et l'appel de l'histoire: Rationalisme et révolutions positivistes.* Droz, Geneva

Flügel E 1913 The history of English philology. In: *Flügel Memorial Volume.* Stanford University, Stanford, California

Lutz A 1982 Das Studium der Angelsächsischen Chronik im 16. Jahrhundert: Nowell und Joscelyn. *Anglia* **100**: 301–356

Murphy M 1981 Edward Thwaites, pioneer teacher of Old English. *Durham University Journal* **42(2)**: 153–59

Palmer D J 1965 *The Rise of English Studies.* Oxford University Press, London

Origin of Language Debate in the Eighteenth Century

Paul B. Salmon

The origin of language was keenly debated in the eighteenth century, most notably in 1770, when the Berlin Academy of Sciences proposed the topic as the subject for a prize essay competition. It is worth noting at the outset that language meant different things for different writers, depending on what they considered to be the point at which language originated. Is language created when the first distinctive articulated sound is produced, or only when communication has taken place? Were the first utterances spontaneous cries or imitations of the sounds of other creatures? How did a primitive vocabulary expand, and how did a listener come to understand a speaker? Does the term 'language' imply some degree of codification, for example, into word-classes, and if word-classes are distinguished, in what order were they introduced into language?

The eighteenth-century debate on the origin of language reflects current interests in the development of society on the one hand, and the nature of the human mind on the other. Much of the discussion of the latter topic arises from the reception of John Locke's (1632–1704) *Essay concerning Human Understanding* (1690), though, at the beginning of Book III, Locke himself was content to state the orthodox view on the origin of language, before proceeding to other matters:

> God, having designed Man for a sociable Creature, made him not only with an inclination, and under a necessity to have fellowship with those of his own kind; but furnished him also with language, which was to be the great instrument and common tie of society.

Although Leibniz took issue with Locke for his complete empiricism, Locke himself distinguishes between ideas of sensation and ideas of reflection ('the perception of the operations of our own minds within us'), and it was in reaction to this residual rationalism that Etienne Bonnot de Condillac (1714–80) wrote his *Essai sur l'origine des connoissances humaines* (1746), which sets out to reduce the sources of ideas to sensation alone. Condillac presents a hierarchy of faculties proceeding from sensation to reflection, before ascending to the more volitional mental activities. One of the intervening stages is 'imagination' (the power to recreate a previously received mental image), which is fostered by the use of signs (Condillac 1947 [1746]: 14–24). This analysis is in the first book of Condillac's *Essai*, but his account of the origin of language is in Book II, where he posits two children alone in the world and left to their own devices; their first utterances are described as natural cries, expressing perhaps the desire to obtain an object, directed towards that object by gesture or mime, and producing assistance involuntarily, i.e., at a prehuman, or prereflective level. The recurrence of similar incidents and similar reactions activated the memory, and the first speakers began to 'carry out reflectively [i.e., at a fully conscious level] what they had previously done spontaneously'; this language was sufficiently effective to encourage its speakers later to codify a language deliberately, and as speech sounds developed in complexity it became apparent that speech was a more efficient medium of discourse than gesture, which was eventually abandoned (Condillac 1947 [1746]: 60–62).

The sociological strand of enlightenment thought is represented by Jean-Jacques Rousseau's (1712–78) *Discourse on the Origin of Inequality* (the 'Second Discourse' of 1755). This work deals with the origin of language at two points (1966 [1755]: 146–61 and 166–68). In both projections Rousseau outlines an emergence of language which, as he admits (1966 [1755]: 146) is generally indebted to Condillac: natural cries, subsequently varied and reinforced by gestures. He does not go into the development of articulation, but he notes that speech is an effective means of communication where visual contact is impossible, for example, in darkness, and continues with a statement that sounds were allotted meanings by common consent (1966 [1755]: 148) beginning with nouns designating objects. This scheme follows a passage in which Rousseau imagines communication taking place in a state of nature between mother and child; but he declares himself baffled by the paradox that society necessitates communication in language, while language cannot exist before society is established. He therefore leaves the question of the precedence of language over thought or thought over language to anyone willing to tackle it (1966 [1755]: 151). A slightly later passage sets the origin of language in a primitive society in which language arose from the need to cooperate in joint exploits such as hunting. This necessitated some rudimentary communication, again starting with inarticulate cries and gestures, accompanied in each tribal territory by distinctive conventionalized sounds, the origin of which 'as already said' (1966 [1755]: 167), it is not easy to explain. Rousseau envisages a lengthy period, perhaps of centuries, for the development of the individual languages which grew up in the settled family communities that replaced the looser associations of hunters.

Within a year of the publication of the *Discours*, Moses Mendelssohn (1729–86) issued a German translation, accompanied by an open letter to Lessing in which he attempted to find a solution to Rousseau's difficulties in accounting for the standardization of vocabulary before society became established, by appealing to the association of ideas. The suggestion was not altogether new, for Condillac had already invoked the association of sound, gesture, and circumstance as a factor in the establishment of a prereflective language; but Mendelssohn is attempting to explain the expansion of vocabulary, not its rudimentary constituents. He instances the sight of a dog or a sheep accompanied by the sound of barking or bleating, the imitation of which would at once conjure up the appropriate image in the mind of a listener, so that the bleating of the sheep evoked the image not only of the animal itself, but the meadow on which it was grazing and the flowers in the meadow. The range of reference of the sounds then became extended, and the original meanings obscured, so that signs emerged which had no apparent connection with the objects denoted. He regards the extension of a primitive language through the association of ideas as a phenomenon which precedes the emergence of fully developed reasoning powers (Rousseau 1756: 246–50).

French and German interest in the origin of language was also linked in the person of Philippe Louis Moreau de Maupertuis (1698–1759), President of the Berlin Academy from 1746 until his death. In a short work, *Réflexions philosophiques sur l'origine des langues et la signification des mots*, which appeared in 1748 in a limited number of copies and was reprinted in a collected edition of his works in 1768, he is concerned less with the production of the first sounds than with the process of abstraction from single utterances containing the substance of a sentence to recognizable grammatical structures (1768: I, 264–66). Another work by Maupertuis, a dissertation on the various means used by men to express their ideas (1756 [1754]), begins with a brief statement largely indebted to Condillac, in which language begins with natural cries, which are in this case, however, supplemented by conventional cries as well as gestures. Maupertuis breaks new ground in suggesting that articulated sounds may have arisen from observing the versatility of the tongue and lips, and the economy of effort they allowed compared with vigorous gestures and cries (1756: 350).

The second of Maupertuis' interventions in the debate prompted Johann Peter Süssmilch (1707–67) to address the Academy in October 1756, arguing in favor of a divine origin of language. He published his work in 1766 under the title *Versuch eines Beweises, daß die erste Sprache ihren Ursprung nicht vom Menschen, sondern allein vom Schöpfer erhalten habe* (An attempt to prove that the first language originated not from Man, but from the Creator alone). He sets out his principles as follows:

> Language is either of divine or of human origin.
> If it is of human origin, it is either innate or acquired.
> If language were innate, there would be species-specific natural cries, which is not the case; if, however, it were acquired, it would either consist of random sounds, which would be unsystematic, or else it would be systematic and therefore reasonable.
> The latter is the case, therefore language is the product of reason.
> But reason cannot be conveyed without signs (i.e., speech or writing): therefore language cannot be of human origin: therefore it must be God-given.
> (Süssmilch 1766: 14–16).

Although one of his premises is the unexamined axiom that no reason is possible without language, Süssmilch concedes elsewhere that 'man could indeed have thought without language, but he could not have thought rationally' (1766: 52), i.e., would not have the ability to make predications and judgments. He rejects the possibility that there could have been a primitive language which was subsequently perfected.

The question of the origin of language continued to be discussed in the Berlin Academy; in 1759 Johann Heinrich Samuel Formey (1711–79), the Permanent Secretary of the Academy, presented a brief *Réunion des principaux moyens employés pour découvrir l'origine du langage, des idées et des connoissances de l'homme*, concluding with the remark:

> The more I think about it, the more I think the pure state of nature to be a real chimera, a grotesque absurdity, an obvious contradiction; and the more I am convinced that the Supreme Being, the Author of our existence, is also the Author of our first ideas, and also of our habitual powers of expressing them.
>
> (Formey 1766 [1759]: 376)

However, it was Formey who announced the Academy's prize essay subject in 1759, couched in terms which suggested that a positive answer was expected—Could man, left to his own devices, invent language? And how could he do so?

The prize was awarded, in a field of 30 entrants, to Johann Gottfried Herder's (1744–1803) *Abhandlung über den Ursprung der Sprache* (1772). In it, he declares that spontaneous cries cannot be the principal source of human language. He differs essentially from Condillac in the role allotted to reflection: Condillac speaks of earlier communication coming about without reflection, while for Herder the notion of nonreflective communication between human beings is totally unacceptable, since he regards reflection as an essential and specific human quality, supplanting the instinct upon which communication is based.

His own investigations begin with a study of the differences between animal and human mentality. Nature gives man compensation for his poor instinctual endowment with *Besonnenheit*, for which Herder gives *Reflexion* as one possible alternative term. This quality of 'reflection' provided man with language: it enabled him to concentrate on a single item in a complex of sensations, and to identify the complex entity by means of this selected feature. The distinctive mark (*Merkmal*) then becomes a mental word, and with this, human language is discovered (Herder 1772: 56). The example of this mode of selection is the identification of a sheep as 'the bleating one'; the sound of bleating became the name of the sheep, and would have been its name even if no tongue ever uttered it. This is in effect imitation, though Herder denies that this is the case (1772: 58), apparently implying that man has in some way identified the essential character of the animal. This is an extreme position, tempered in later pages, which speak in passing of gesture as a component of early language, or outline a theory of word-classes (1772: 135, 138). An earlier passage deals with the creation of word-classes in the course of elaborating the principle of the *Merkmal*, and claims that the first to emerge were 'sonorous verbs' (1772: 81), but the example ('the bleating one') has all the marks, semantic and structural, of a noun.

Herder takes issue with Süssmilch over his paradox that language cannot exist without reason or reason without language, by claiming that the earliest stages of language do not imply the operation of 'higher' reason (1772: 88), and scores a debating point against Süssmilch when he claims that reason would have been necessary for Adam to understand the words of God (p.63). However, the paradox is not finally solved by asserting the identity of *ratio* and *oratio* (p.61), for the rationality identified with speech is itself a direct gift from God implanted in man at creation.

Language first emerged, then, from the recognition of sounds; the creation of words to represent soundless objects is explained by the function of the mind as a *sensorium commune* (1772: 94), i.e., a form of synesthesia, supported by examples drawn rather too readily from the German of Herder's own day.

In the shorter second part of the *Abhandlung*, Herder deals with the question of how man could have devised language for himself. He proposes four 'laws of nature' which determine that man is a creature of language: the first contrasts human free agency, characterized by reflection, with the prescribed instinctive ways of animals; the second defines man as a creature of society deriving from the family group; the third explains the existence of mutually incomprehensible languages as a function of migration and territoriality, and the fourth sees language as a common human characteristic, with an underlying universality of grammar implicitly dependent on common mental development.

Besides giving little weight to the communicative aspect of speech, Herder also introduces gesture as a constituent feature more or less as an afterthought, and gives scant attention to the way in which meanings are established. He mocks Condillac's notion of convention, but he puts nothing in its place apart from the accompaniment of a characteristic sound by a gesture, which is enough to identify an object. The repeated cooccurrence of sound, gesture, and object could, indeed, be claimed to be enough to establish meaning by a kind of tacit agreement, and this would be a position not very far removed from Condillac's.

In spite of the critical acclaim which Herder's *Abhandlung* received in its own day and later, it is less conclusive than might be expected: it is not clear that the recognition of a distinctive mark is sufficient to constitute language, and the notion that reflection compensates for weakened instincts is no more than a hypothesis. Herder himself expressed dissatisfaction with the work before it appeared, came near to disowning it, partly under the influence of Hamann, and in the next few years wrote equivocally on the subject of human origin. However, the work received general acceptance in Germany; its principles were tacitly adopted by Johann Christoph Adelung (1732-1806) in 1806, and explicitly commended in the middle of the nineteenth century by Jacob Grimm (1785–1863) (1852 [1851]: 140). Its strength lies in the vigor of the writing, and above all in the confidence with which Herder proclaims that it is 'nonsense' to postulate a divine origin of language.

Four of the other entrants published their essays independently in the wake of the competition, and three of them, the Abbé Copineau (fl.1750–80), Johann Nikolaus Tetens (1737–1807) and Dietrich Tiedemann (1748–1803) accepted a human origin, but in terms far less decisive than Herder; the first two also suggested that conventional meanings could be established in a family context if their inventor were in a position of authority, thus avoiding the necessity for formal deliberation. At about the same time Karl Wilhelm Jerusalem (1746–72) wrote a brief essay on the subject (published after his untimely death by Lessing), in which he argued for a human origin of language by a syllogistic method comparable to that used by Süssmilch to prove the opposite.

There are other important works of the time which have no direct bearing on the debate in Berlin, but which contributed to the climate of opinion. Amongst these may be considered, for example, a section of Bernard de Mandeville's (1670–1733) *Fable of the Bees* (1714), or the 'Dissertation on the origin of language' appended to the third (1767) and subsequent editions of Adam Smith's (1773–90) *Theory of Moral Sentiments*, which goes in some detail into the establishment of word-classes. The best-known and most extensive treatment of the subject in the English-speaking world was, however, Lord Monboddo's (1714–99) *On the Origin and Progress of Language* (1773–92), in which the author envisaged a human origin of language in two stages, much as Condillac had done, but with the deliberative second stage made far more explicit and formal. The work was widely discussed, and a German version of the first three volumes appeared in 1784 in a German translation sponsored and introduced by Herder. In French, there was a second contribution by Rousseau, his (posthumous) *Essai sur l'origine des langues* (1781), written at about the same time as the *Discours*, according to which elaborated language-systems emerge only when man has begun to settle in agricultural and tool-using communities (1968 [1781]: 97).

Bibliography

Aarsleff H 1974 The tradition of Condillac: The problem of the origin of language in the eighteenth century and the debate in the Berlin Academy before Herder. In: Hymes D (ed.) *Studies in the History of Linguistics*. Indiana University Press, Bloomington, Indiana

Adelung J C 1806 *Mithridates oder allgemeine Sprachkunde mit dem Vater Unser als Sprachprobe in bey nahe fünfhundert Sprachen und Mundarten*, vol. I. Voss, Berlin

Condillac E B de 1947 [1746] *Essai sur l'origine des connoissances humaines*. In: Le Roy G (ed.) *Oeuvres philosophiques*, vol. 1. Presses Universitaires de France, Paris

Formey J H S 1766 [1759] Réunion des principaux moyens employés pour découvrir l'origine du langage, des idées et des connoissances de l'homme. *Mémoires de l'académie royale des sciences et des belles-lettres*. Classe de philosophie spéculative, année MDCCLIX. Haude & Spener, Berlin

Gessinger J, Rahden W von (eds.) 1989 *Theorien vom Ursprung der Sprache*. De Gruyter, Berlin

Grimm J 1852 [1851] Über den Ursprung der Sprache. *Abhandlungen der königlichen Akademie der Wissenschaften zu Berlin: Aus dem Jahre* 1851; *Philologisch–historische Classe*. Dümmler, Berlin

Grimm J 1984 [1851] *On the Origin of Language*. Brill, Leiden (Transl. by Wiley R A)

Herder J G 1772 *Abhandlung über den Ursprung der Sprache*. Voss, Berlin

Herder J G 1966 [1772] In: Moran J H, Gode A *On the Origin of Language*. University of Chicago Press, Chicago, Illinois (Transl. by Gode A)

Maupertuis P L M de 1768 [1748] *Réflexions philosophiques sur l'origine des langues et la signification des mots*. *Oeuvres complètes*, vol. 1. Bruyet, Lyon

Maupertuis P L M de 1756 Dissertation sur les différents moyens dont les hommes se sont servis pour exprimer leurs idées. *Histoire de l'académie royale des sciences et belles lettres: Année 1754*. Haude & Spener, Berlin

Rousseau J-J 1966 [1755] *Discours sur l'origine et les fondemens de l'inégalité parmi les hommes*. In: Starobinski J (ed.) *Oeuvres complètes*, vol. 3. Gallimard, Paris

Rousseau J-J 1756 *Johann-Jacob Rousseau Bürgers zu Genf Abhandlung von dem Ursprung der Ungleichheit unter den Menschen*. Voss, Berlin (Transl. by Mendelssohn M)

Rousseau J-J 1968 [1781] *Essai sur l'origine des langues où il est parlé de la mélodie et de l'imitation musicale*. Ducros, Bordeaux (Ed. by Porset C)

Salmon P 1989 Also ran: Some rivals of Herder in the Berlin Academy's 1770 essay competition on the origin of language. *Historiographia Linguistica* **16**: 25–48

Stam J H 1976 *Inquiries into the Origin of Language: The Fate of a Question*. Harper & Row, New York

Süssmilch J P 1766 *Versuch eines Beweises, daß die erste Sprache ihren Ursprung nicht vom Menschen, sondern allein vom Schöpfer erhalten habe*. Buchladen der Realschule, Berlin

Discovery of Sanskrit by Europeans

Rosane Rocher

The discovery of Sanskrit by Europeans played a determinant role in the development of comparative Indo-European linguistics. Yet, this process was neither rapid nor linear. The observation, recording, and transmission of data, the methods according to which they were analyzed and interpreted within existing theories of language, and the purposes which they were made to serve, were largely independent variables. This complex history has been further muddied by the tendency of later generations to read their predecessors' statements anachronistically.

1. Pioneers: Missionaries and Travelers in India (1583–1768)

Though the ancient Greeks have left records, some accurate, most fantastic, of their travels to India, their linguistic slate is blank. Mercantile contacts between Rome and India also failed to prompt linguistic observations. The first-known linguistic comment was made in a letter of 1583 by an English Jesuit in Goa, Thomas Stephens (Stevens), who does not mention Sanskrit, but points to a structural similarity between Indian languages and Greek and Latin. It remained unpublished until 1957. In 1586, the Florentine litterateur and merchant Filippo Sassetti wrote from Cochin of Sanskrit's status as the learned language of India, of its high antiquity and complexity, and of lexical similarities with Italian, notably in numerals 6 to 9 and words for 'God' and 'snake.' His letters were only published in 1855.

Europeans began to study Indian languages in a sustained manner in the seventeenth century, with evangelical efforts primarily in South India. Jesuits played a leading role in the discovery of Sanskrit. Since, following Roberto (de) Nobili (1577–1656), they targeted the upper castes and accommodated existing cultural and social norms—the controversial issue of the Malabar rites—they tended to devote great attention to the language of the high Brahmanical tradition. Nobili's works attest to his knowledge of Sanskrit, yet contain no linguistic observations. The first-known European grammar of Sanskrit was composed in Agra between 1660 and 1662 by Heinrich Roth. Written in Latin and on a Western pattern, it followed traditional Indian terminology and analysis. Brought to Rome and long thought lost, it was only published in 1988. Roth also contributed the tables of Devanāgarī script and the transliterations of the Latin texts of the Lord's Prayer and of the Hail Mary for Athanasius Kircher's *China Illustrata* (1667). The transliteration of the Lord's Prayer entered polyglot compilations from Andreas Müller (1680) to John Chamberlayne (1715). A grammar written in Kerala in the first third of the eighteenth century by Johann Ernst Hanxleden, and later brought to Rome, described, and used by Paulinus a Sancto Bartholomaeo, appears to have been lost since.

Protestant missionaries in Danish Tranquebar, reports from whom were published in Germany from 1718 on, also contributed information on Sanskrit. In 1717, Bartholomaeus Ziegenbalg, primarily a scholar of Tamil, provided Christian Benedict Michaelis with a syllabary for Sanskrit. In a letter of 1725, published in 1729, Benjamin Schul(t)ze, provoked by a remark by Veyssière de La Croze to the effect that numerals in Malabar are 'pure Latin,' listed the Sanskrit numerals 1 to 20, 30, and 40, with equivalents in Latin for all, and in other European languages for some. He also offered in the *Orientalisch- und Occidentalischer Sprachmeister* (1748), translations of the Lord's Prayer in Sanskrit and other Indian languages, which still recur in Adelung's *Mithridates* (1, 1806).

French Jesuits had the greatest impact on scholarship with the publication of their *Lettres Edifiantes et Curieuses* (1707–) in multiple editions and translations. Most important was a survey of Sanskrit literature by Jean François Pons (1740), which described Sanskrit as 'admirable for its harmony, copiousness, and energy' and reported on the analysis by which native grammarians had reduced 'the richest language in the world' to a small number of primitive elements to which derivational suffixes and inflectional endings are added according to rules the application of which generates 'several thousand correct Sanskrit words.' Published in 1743, it informed the works of de Brosses, Dow, Sinner, Voltaire, Monboddo, Halhed, Beauzée, and Hervás, and was plagiarized by John Cleland (1778). Of less immediate, yet momentous, impact was a request issued by the Abbé Bignon upon assuming the direction of the French Royal Library in 1718, that French missionaries in Asia send manuscripts according to a list of desiderata drawn up by the orientalist Etienne Fourmont. In 1732–33, Pons sent from Bengal 168 Sanskrit manuscripts which included the first five chapters of a grammar in Latin with Sanskrit words in Bengali script. A sixth chapter on syntax, completed in South India, in French with Sanskrit words partly in Telugu, partly in Roman script, was forwarded in 1772 by Gaston-Laurent Coeurdoux. Pons's grammar was the source of the table of Bengali script in the *Encyclopédie* and the primer used by the first students of Sanskrit in Europe, which Anquetil-Duperron came close to publishing in 1804. Coeurdoux was the author of a memoir that included, besides a basic Sanskrit vocabulary, lists of Sanskrit words that have equivalents in Latin, Greek, or both, notably the numerals 1 to 21, 30, 40, and

100, pronouns, and a partial paradigm of *as-* 'to be.' Solicited in 1767 by the Abbé Barthélémy of the Académie des Inscriptions et Belles-Lettres, who gave it to Anquetil-Duperron, it was only read in 1786 and published in 1808, the same year as Schlegel's *Ueber die Sprache und Weisheit der Indier*, which rendered it obsolete.

These pioneers' sometimes faulty data—muddled by erratic transliterations that reflected different local pronunciations and the recorders' various native tongues, and subject to misreadings—were interpreted according to, or used to bolster, divergent linguistic theories. Gottfried Siegfried Bayer (1738) explained similarities by contact and borrowing, pointing to the Indo-Greek kingdoms after Alexander's campaigns as the source of commonalities between Greek, Persian, and Sanskrit, yet the memoir of the Tranquebar missionary Christian Theodor Walther (1733) that he appended attributed them to the common 'Scythian' origin propounded by Boxhorn, Saumaise, Jäger, Leibniz, and others. La Flotte (1768) also posited a 'North Asian' origin for the Brahmans, while Sinner (1771) thought exclusively in terms of borrowing from Greek and Latin into Sanskrit, yet wondered how it could have taken place. The emphasis on numerals and other basic vocabulary, i.e., vocabulary unlikely to have been borrowed, which De Laet, Grotius, Leibniz, and others had pioneered, did not necessarily lead to the conclusion of a common origin. Schul(t)ze was inclined to credit similarities between Latin and Sanskrit to borrowing from Portuguese, yet wondered how Brahmans could have done without counting for so long, while Coeurdoux favored the biblical myth of Babel, making of Sanskrit one of the primitive languages which preserved elements that antedated separation. Scholars in Europe eagerly awaited more information, which they hoped would further their particular lines of enquiry, from the 'language mechanics' of de Brosses (1765), fascinated by Pons's report of Sanskrit's derivation from a handful of primitive elements, to the Celtomania of Le Brigant (1767).

2. Breakthrough: British Colonials in Bengal (1768–1794)

When, in 1765, the East India Company obtained the administrative rights to Bengal, Bihar, and Orissa, knowledge of India's culture became a colonial necessity. The reluctance of pandits to instruct foreigners in their sacred language and Sanskrit's reputation for being 'amazingly copious' and for showing a 'regularity of etymology and grammatical order,' induced Alexander Dow (1768) to suspect that it had been invented by Brahmans 'upon rational principles' to be 'a mysterious repository for their religion and philosophy.' This led Christoph Meiners (1780) to explain similarities by assuming that the Brahmans had patterned their artificial language after Greek, a notion Dugald Stewart and Charles William Wall still held in the nineteenth century.

Governor Warren Hastings' decision in 1772 to apply native laws in courts and his patronage of both pandits and orientalists caused a breakthrough. In the introduction to the translation (1776) of the code of Hindu law commissioned by Hastings, which underwent several editions and translations, Nathaniel Brassey Halhed gave an account of Sanskrit that interested Beauzée and Monboddo among others. In his grammar of Bengali (1778) he digressed on features of Sanskrit, spelling out the importance of similarities in basic vocabulary, i.e., 'not in technical and metaphorical terms, which the mutuation of refined arts and improved manners might have occasionally introduced; but in the main groundwork of language, in monosyllables, in the names of numbers, and the appellation of such things as would be first discriminated on the immediate dawn of civilization,' and noting similarities in morphology, such as the conjugation in *-mi* in Sanskrit and Greek. In an unpublished letter of 1779, he articulated a method built on Monboddo's view that Latin was a dialect more ancient than Greek: Sanskrit, closer to Latin than to Greek, had to be even more ancient, yet, what of 'the existence of the dual number and the middle voice in this tongue and in the Greek, which are totally absent from the Latin'? Holding, after Monboddo, that 'it is one of the last gradations of art to simplify a complex machine,' he mentioned 'in favour of the pretensions to priority of original in the Shanscrit [sic] language, that it contains every part of speech, and every distinction which is to be found in Greek or in Latin, and that in some particulars it is more copious than either.'

Sanskrit's 'copiousness,' noted by Pons, Dow, and Halhed, was emphasized again in a statement (1786) by Sir William Jones, a scholar of Persian and one of the most accomplished men of his day, who, as a judge of the Supreme Court in Calcutta, began to study Sanskrit to check the authenticity of legal opinions given by pandit assistants to the courts:

> The Sanskrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity, both in the roots of verbs and in the forms of grammar, than could possibly have been produced by accident; so strong indeed, that no philologer could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists: there is a similar reason, though not quite so forcible, for supposing that both the Gothic and the Celtic, though blended with a very different idiom, had the same origin with the Sanskrit; and that the old Persian might be added to the same family.

Taken out of context, this was elevated later to the rank of a charter of comparative Indo-European linguistics. For Jones, and in keeping with the monogeneticism of his times, it was part of a search for the cradle of civilization from which arts, letters, science, religion, and philosophy might have spread, and which linked the Indians not only to the Persians, Goths, and Celts, but also to the Ethiopians, Egyptians, Chinese, Japanese, and even Peruvians. Less famous, yet of lasting importance, was Jones's 'Dissertation on the Orthography of Asiatick Words in Roman Letters' (1786), informed by the Indian tradition of phonetics, which set a standard for the transliteration of Sanskrit in Roman script.

Most noticed was the unveiling in rapid succession of Sanskrit literary masterpieces with translations by Charles Wilkins of the religiophilosophical poem *Bhagavadgītā* and the moral fables *Hitopadeśa* (1785, 1787), and by Jones of the play *Śakuntalā*, the erotic-mystical songs *Gītagovinda*, and the 'Laws of Manu' (1789, 1792, 1794). These underwent multiple editions and translations and drew enthusiastic comments: the *Bhagavadgītā* from Schopenhauer, *Śakuntalā* from Herder and Goethe. By founding the Asiatic Society in Calcutta (1784) and its organ, the *Asiatick Researches* (1788–), Jones provided a forum for further advances and a channel to broadcast them to Europe, where they were republished and translated into French and German.

3. Taking Stock in Europe (1780–1806)

European curiosity about Sanskrit was piqued, yet interpretations remained scattered. Summing up the evidence provided by Pons, Dow, and Halhed, Michael Hissmann (1780) still attributed similarities to borrowing into Sanskrit. Drawing from the same sources, Beauzée's five-page article in the *Encyclopédie méthodique* (1786)—up from a few lines in Diderot's original *Encyclopédie* (1765)—sought to provide a model for an international scholarly language.

The discalced Carmelite, Paulinus a Sancto Bartholomaeo (born Philip(p) Wessdin (Vesdin)), returned in 1789 from Malabar and undertook to catalog oriental collections in Rome and to publish in Latin for the use of future missionaries encyclopedic, if polemical, works that incorporated the sum of current knowledge on India. These included a description of Indian scripts (1791) based on the *Alphabetum Brammhanicum* and the *Alphabetum Grandonico-Malabaricum* edited by Amaduzzi (1771, 1772); two grammars—the first grammars of Sanskrit to be printed (1790, 1804)—based on manuscripts of Hanxleden; an edition of the first section of Amarasiṃha's dictionary (1798); and dissertations on the relationship of Zend (Avestan), Sanskrit, and German, and of Latin, Zend, and Sanskrit (1798, 1802). They encapsulate traits of the eighteenth century: the authority still granted to testimonies of classical antiquity; an emphasis on basic vocabulary presented in tabular form for comparison; and, particularly for clerics, a wish to match linguistic evidence with biblical accounts. Explanations by contact and borrowing, however, were discarded, and common origin affirmed. The connection of German and Iranian was accepted, yet, with Sanskrit added, a northern, Scythian origin was rejected in favor of an oriental cradle. Puzzlement persisted on whether to consider Sanskrit closer to Latin or to Greek, with preference for the former, yet with an acknowledgment that morphological similarities, such as the augment and the reduplicated perfect, point to the latter. Franz Carl Alter (1799) published the Sanskrit words in the St. Petersburg vocabularies corrected by Paulinus, and Paulinus's and his comparisons of these with other oriental languages. Hervás (1801) and Adelung (1, 1806) drew heavily on Paulinus's work.

4. A New Beginning: Sanskrit in Paris (1802–08)

Paulinus's first printed grammar provided a means to learn Sanskrit, which the publications from Calcutta made a subject of literary, philosophical, and linguistic interest, not just of evangelical or colonial necessity. In 1802 the Paris collections, the richest in Europe, attracted at the same time European scholars eager to learn Sanskrit and a member of the Asiatic Society returned from Calcutta eager to teach it. Detained in Paris by war between Britain and France, Alexander Hamilton cataloged anew the Sanskrit manuscripts in the French National Imperial Library with their keeper, Louis-Matthieu Langlès, and introduced all those who were interested to Sanskrit. Of the first consequence was his daily tutoring of Friedrich Schlegel, which provided a foundation for Schlegel's *Ueber die Sprache und Weisheit der Indier* (1808). In this complex, sometimes paradoxical book, which blends linguistic, literary, historical, philosophical, and theological themes, Schlegel was already retreating from the first enthusiasm that had him exclaim that Sanskrit is 'the actual source of all languages, of all thoughts and poetry of the human spirit; everything, everything without exception stems from India,' yet he still viewed Sanskrit as the most perfect, spiritual, quasidivine language, the oldest, and possibly the parent of, 'organic' inflectional languages, which he considered superior to the 'mechanical' agglutinative languages. Deeming lexical similarities inherently inconclusive, he focused on morphological similarities as the determining criterion for establishing genealogy.

5. Mainstream (1808–)

Schlegel's example demonstrated that Sanskrit could be learned in Europe. It inspired Antoine-Léonard de Chézy, who, self-taught with the grammars of Paulinus and Pons and other manuscripts in the French National/Imperial Library, became in 1814 the first incumbent of a chair of Sanskrit, at the Collège de France. August Wilhelm Schlegel followed in the foot-steps of his younger brother, learning Sanskrit in Paris before initiating its teaching in Germany (Bonn 1818). Franz Bopp, Othmar Frank, and others went on from Paris to London to consult manuscripts in the East India Company Library founded in 1801 according to a plan proposed by Charles Wilkins, who became its first librarian. Thanks to collections made in India by the likes of Colin Mackenzie and Henry Thomas Colebrooke (the first author of a Sanskrit grammar in English, which remained incomplete, and the first Sanskrit scholar some of whose works are still read for other than antiquarian purposes), the London holdings soon eclipsed those in Paris; however, Britain was slow in recognizing Sanskrit as more than a colonial necessity. Hamilton, upon his release from France in 1806, taught Sanskrit at the East India College, but no mainstream British university offered it until 1832, when the Boden chair was created at Oxford thanks to a bequest by a former military officer of the East India Company. The chair's first incumbent, Horace Hayman Wilson, who had learned Sanskrit from pandits in India, was embroiled in a dispute with A. W. Schlegel, who had learned Sanskrit in Europe, about the qualifications required of a Sanskrit scholar, so epitomizing the extent to which Sanskrit had become appropriated by Europeans, particularly on the Continent.

More than joining the academic mainstream, Sanskrit took pride of place in the development of comparative Indo-European grammar. Though, unlike Friedrich Schlegel, Bopp never referred to Sanskrit as the parent language, he made it the centerpiece of his comparative studies of conjugational and other grammatical systems, and, although he did not share Schlegel's Romantic enthusiasm but bore down on matters purely linguistic, he likewise appended translations of Sanskrit texts to his *Conjugationssystem* (1816). Sanskritocentrism remained the norm for generations of comparatists. So significant was the discovery of Sanskrit in the development of comparative Indo-European linguistics that it has been felt necessary of late to voice reminders that it was not a prerequisite—as the works of Rask, Grimm, and others demonstrate. Accounting in part for the magnitude of this impact are the quality, quantity, antiquity, and longevity of Sanskrit literature, yet more important was the fact that Sanskrit was first taught to Europeans—directly or mediately—according to the enduring tradition of rigorous analysis by Pāṇini and other Indian grammarians and phoneticians. The identification of the root as the smallest common denominator of derived forms, vocalic alternation, derivational and inflectional suffixes, substitution rules, zeroing, etc., and the description of articulatory processes were the procedures according to which Europeans learned Sanskrit from pandits. While this created an illusion that Sanskrit is more regular and transparent than other languages, the fact that the same procedures could serve to analyze cognate languages provided a framework that facilitated comparison.

Bibliography

Benfey T 1869 *Geschichte der Sprachwissenschaft und orientalischen Philologie in Deutschland.* Cotta, Munich.

Camps A, Muller J-C 1988 *The Sanskrit Grammar and Manuscripts of Father Heinrich Roth S. J. (1620–68).* Brill, Leiden

Mayrhofer M 1983 Sanskrit und die Sprachen Alteuropas: Zwei Jahrhunderte von Entdeckungen und Irrtümern. *Nachrichten der Akademie der Wissenschaften in Göttingen* 5

Muller J-C 1985 Recherches sur les premières grammaires manuscrites du sanskrit. *Bulletin d'Etudes Indiennes* **3**: 125–44

Rocher L 1977 *Paulinus a S Bartholomaeo: Dissertation on the Sanskrit Language.* Benjamins, Amsterdam

Rocher R 1968 *Alexander Hamilton (1762–1824): A Chapter in the Early History of Sanskrit Philology.* American Oriental Society, New Haven, Connecticut

Rocher R 1983 *Orientalism, Poetry, and the Millennium: The Checkered Life of Nathaniel Brassey Halhed* 1751–1830. Motilal Banarsidass, Delhi

Schlegel F 1808 *Ueber die Sprache und Weisheit der Indies.* Mohr & Zimmer, Heidelberg (New edn. by E F K Koerner, Benjamins, Amsterdam, 1977)

Schwab R 1984 *Oriental Renaissance: Europe's Rediscovery of India and the East, 1680–1880.* Columbia University Press, New York

Windisch E W O 1917 *Geschichte der Sanskrit-Philologie und indischen Altertumskunde.* Trübner, Strasbourg

Wüst W 1929 Indisch. In: Streitburg W A (ed.) *Die Erforschung der indogermanischen Sprachen: Indisch, Iranisch, Armenisch.* De Gruyter, Leipzig

SECTION IX

The Main Strands of 19th Century Linguistics

SECTION IX

The Main Strands of 19th Century Linguistics

History of Comparative Linguistics

N. E. Collinge

It is not easy in practice to distinguish 'comparative' from 'historical' linguistics (but for the relatively independent history of the latter see the next article devoted to *History of Historical Linguistics*). In an 1813 review Thomas Young (1773–1829)—inventor of the term 'Indo-European'—declared that the results of the two studies were respectively the 'artificial' and the 'natural' aspects of the same interlanguage relationship. In the later years of the twentieth century it is clear that pure comparativism is now a separate enterprise, especially when its findings are directed to the classifying of languages by their ascription to types. (For the history of such 'typology' see *History of Typology and Language Classification*.) Before the nineteenth century too little was done, at least in an organized and principled way, on either of these fronts for the distinction to be necessary. In the nineteenth century itself plenty was done both in comparing languages (and different stages of some one language) and in tracing paths of change of linguistic forms. Even so, to label any scholar of that century as being decidedly of the one school rather than the other is always arbitrary and usually wrong.

To separate 'comparative' from 'contrastive' linguistics is simpler. The latter is a straightforward statement of significant differences in systems and forms between two languages, an exercise which is usually meant to be of practical use to a teacher or a learner of a second language: as early as the twelfth century, for example, such contrasts were logged between Arabic and Hebrew. But comparative study conversely aims at a calculus of linguistic likeness between the inventories, and functions, of categories across a range of languages. This calculus is then exploited to establish one or more of the following congruences:

(a) the typological (or T-strain): this allows distribution into classes according to different generalized models of how phonologies, morphologies, syntaxes and semantic systems operate;
(b) the evolutionary (or E-strain): this leads first to demonstrations of specific changes in actual forms in and between languages, then to universal theorems of language development;
(c) the genetic (or G-strain): this leads to statements on the 'genealogy' of languages, the past geographical movements of their speakers, and even the nature of their earliest societies.

Each strain has been pursued in isolation and every combination has been explored. Some scholars have believed that evolution is controlled by type; others have held the reverse to be true; others that no connection exists. Some cannot envisage evolution except in genealogical terms; a few see a steady convergence of genetically unrelated but cohabiting tongues which move together in increasing likeness into large panglossias.

1. Early Genealogies

In antiquity, and in the Western world until the Renaissance, comparative study was precluded by shortage of data. If new forms of speech were encountered, insularity defeated enquirers. So the Greek historian Herodotus (1.139) naively reports that all Persian names end in the letter *s*, like Greek names—a false coincidence produced by Hellenizing transcribers. The Romans could at least compare Latin with other tongues of Italy and with mainland Greek; evidence from more eastern languages was virtually ignored. Even then they scarcely went beyond problems of translation, as when Lucretius (1.182) complains of the poverty of Latin in the field of philosophical terms, while Cicero (*Att.* 12.52.3) claims to have a personal vocabulary adequate for the task. But by the sixteenth century much more was known of the world's languages, and the natural urge to compare was able to combine with another human interest, that in families. The G-strain appeared. By 1588 Filippo Sassetti (b.1540) of Florence had mastered enough commercial Sanskrit to opine, mostly from the likeness of some number names, that Sanskrit and Italian are relatives. Benjamin Schultze in 1725 on the same basis linked Sanskrit with Greek, Latin, and German. (The Jesuit Heinrich Roth (1620–68) had already produced a teaching grammar of Sanskrit, written in Latin, in 1660–62; unhappily it was lost from 1665 until 1967.) Already in the seventeenth century the idea had been floated of a lost (i.e., dead) parent language. It was often called 'Scythian,' and the name and possibility had been mentioned even in 1569 by the Netherlander Johannes Goropius Becanus (van Gorp, 1518–72). But the real promoters of this notion were Claudius Salmasius (1643) in England and Georg Stiernhielm (1671) and Andreas Jäger (1686) in Sweden. There was a coexistent and curious idea that an existing language must be that original parent tongue. Judeo–Christian devoutness long espoused Hebrew in that role, until around 1610 the work of Joseph Justus Scaliger (1540–1609) finally put it out of court. Theodor Bibliander had pursued it in Switzerland; but oddest is the rambling etymological essay of Becanus himself, the comparative *Origines Antwerpianae*, which linked Dutch–Flemish with Japhet and offered it as the 'language of Adam'; all this has the air of a jest pushed too far or of an enthusiast whose subject has run away with him. Some Swedish scholars followed Becanus (see Metcalf 1974), but most seventeenth-century enquirers were happier with an unknown *Ursprache*. On the other hand, Sanskrit with its structural clarity beguiled adherents, so that a Sanskritocentric approach to the history of the group of languages to which it belongs (if not an actual parent status for Sanskrit itself) seems to have begun in 1740 with a letter (to Father du Halde, published in 1743 in a collection of Jesuit correspondence) by Father Jean-François Pons (1698–1752). It was reinforced in F. Schlegel's 1808 book (see below), half accepted even by F. Bopp in 1816, and only received its quietus when proof came in the later 1870s as to the nonoriginal nature of the Sanskrit vowel system (this being part of the evidence for establishing the 'law of the palatals'; see Collinge 1985: 133–135). These gropings towards family relationships as the key to comparative findings became more soundly based as the methodology was refined, as when scholars grasped the crucial distinction between a language's native forms and those which it has 'borrowed.' Then another group of languages found researchers who were quicker off the mark. After work by Martin Fogel (1634–75) and Johann Eberhard Fischer (1697–1771), the relation of Hungarian to Finnish, and an adumbration of the Finno–Ugric family tree, was set out first in 1770 by János Sajnovics (1733–85) and then in 1799 by Sámuel Gyarmathi (1751–1830), largely on grammatical grounds. By 1733 Vasilij Nikitič Tatiščev (1686–1750) had at least put together the Slavonic languages and suggested various sociogeographic reasons for their differentiation (see also Berezin in Droixhe 1984: 53–67). At which point there were brought to bear on this whole G-strain of comparativism two complementary impulses, one informative and one programmatic.

2. More Facts and Clearer Methods

As to the first impulse, an explosion of data occurred between roughly 1785 and 1820. There had been some input of raw but comparable facts at earlier stages. In 1555 Conrad Gesner (1516–65) and in 1613 Claude Duret (ca.1570–1621) had offered texts, or at least words, as compared across numerous languages, old and contemporary (indeed, those 'of this universe,' claimed Duret). But in 1787–89 the German naturalist Peter Simon Pallas (1741–1811) published an enormous compilation of compared forms in all the known languages of his day (which Antonio Balbi (1781–1848) in his 1826 *Atlas* computed at 700 quotable and perhaps 2,000 in all). Others were spurred on. In 1805 came the result of the cataloging of linguistic data which had occupied the Spaniard Lorenzo Hervás y Panduro (1735–1809) for several decades. Finally in the years 1806 to 1817 there emerged the five-volume *Mithridates* of Johann Christoph Adelung (1732–1806), which was named after Gesner's work, based on the comparison of the Christian 'Lord's Prayer' in ultimately about a thousand languages, and from 1809 coauthored by Johann Severin Vater (1771–1826). The appeal of these reports was enormous. Of course, all were unsafe on many facts and slants. Adelung, for example, envisaged early man as using simple monosyllables in a primitive Kashmir (see also Metcalf in Droixhe 1984: 101–15). Though an avowed E-strain man himself he let G-strain enthusiasm induce him even to link Sanskrit with Finno-Ugric and Semitic languages. Contemporary criticism on this point was markedly adverse. But at the end of the twentieth century there is much support for the view that what have long been taken as traditional groups of languages are themselves to be derived from ancestral supergroups, and so on, as far as such macro-derivation can be pushed back in time. So that Adelung might be recognized as a 'nostraticist' (to use Holger Pedersen's term) before his day.

The other impulse was a forceful delineation of the scope and the method which might lead to a testable linguistic genealogy. It moved on from the cross-linguistic etymology of Antoine Court de Gébelin (1725–84) who sought 'primitive' languages via word-families. Its positive statement is conventionally attributed above all to Sir William Jones (1746–94), the lawyer, politician and orientalist whose final decade of public service was in eastern India—and more precisely to a single paragraph in his 'Third Anniversary Discourse,' which he gave in February 1786 to his own creation, the Asiatick Society, later the Asiatic Society of Bengal; a concise survey of Jones's interests and contribution to scholarship is to be found in Robins 1987; see also Cannon in Droixhe 1984: 83–94). In that overquoted passage, what is noteworthy is not the suggestion (already in the work of others, notably in the 1778 offering of Nathaniel Brassey Halhed (1751–1830)) that Sanskrit, Greek, Latin, 'Gothic' (Germanic) and Celtic are the likely candidates for membership of the same favored family. This list is certainly fuller and safer than previous slates. But it is spoiled by Jones's perverse insistence that Hindi truly represents the indigenous language of India and is not akin to Sanskrit, and by some wild etymologizing which goes so far as to connect Indian and South American divine names. In any case, the Finno-Ugric scholars (see above) had already demonstrated a 'family.' What was critical, especially for G-strain purposes, was rather Jones's contention (later publicized in Schlegel's book of 1808; see below) that the relevant method of comparison must allot the central role, in plotting evolution from the same stock, to 'the roots of verbs and the forms of grammar.' This was a notable insight into the core and true comparandum of each language, especially coming from one who was renowned as a 'linguist' only in the old sense, that of polyglot. It has been argued that by that formula he was really directing comparativists' attention to basic lexical equations as well as grammatical ones, and to the detailed constructions of verbal phrases; certainly this last is the sector of gross difference which still steadily distances the old Indian idiom from Hindi and the other modern languages of northern India. But if only later did research concentrate on affixal morphology—which is on the whole acknowledged to be the most abiding part of a language—a push towards the central comparanda had been given. Hiob Ludolf (1624–1704) had already put the emphasis there; even Adelung had argued that the identity of roots, rather than words, is critical. That the best sector for comparison is rather vocabulary in general, for both G-strain and T-strain enquirers, was the belief of Jan de Laet (1582–1649) in 1643, supported by Leibniz; it is sometimes energetically revived, as in the recent work of Witold Mańczak. But after Jones, the *communis opinio* was firmly in favor of grammar as the major control. Both this point of procedure and the value of Sanskrit in Indo-European history are essential elements in the famous 1808 monograph of Friedrich Schlegel (1772–1829) on Indian language and culture, a work heavily indebted to Jones. So they are also in the works of Franz Bopp (1791–1867), the chief proponent of comparative–genetic study during the first half of the nineteenth century.

3. Early Typologists

Schlegel, with his brother August Wilhelm Schlegel (1767–1845), used the term 'comparative grammar' (*Vergleichende Grammatik*) in 1803. Vater had written in 1801 of 'comparative language study' (*Vergleichende Sprachlehre/Vergleichendes Sprachstudium*). The Schlegels in any case shared with the great mover of linguistic thought of the time, Wilhelm von Humboldt (1767–1835), an addiction to one particular combination of E-strain and T-strain thinking. The so-called 'traditional' language types, which are termed 'isolating,' 'agglutinating,' and 'inflecting,' and which are based on the incidence and behavior of morphological markers, derive from the interlinked discussions of these scholars. (For this approach as part of typology, see *History of Typology and Language Classification*.) Their agreed E-conclusion was that inflectional languages (which display in a high degree the fusing of morphological information into single markers) are the most fully evolved and possess systems of a 'richness worthy of wonder' (Schlegel 1808: 50–51). Nowadays such a simple relating of T-statement to E-statement, as if types are just so many stages on an historical path of improvement, will not do. But at the time it prevailed even to the extent of depriving typology of independent validity, so that pure T-strain scholarship became unfashionable and sporadic for many years. It was revived partly by Schleicher and by classificatory studies by Steinthal from 1850, and more decisively by the efforts, first published in 1891, of Georg von der Gabelentz (1840–1893), who gave this branch of linguistics its name. Its rise to its present powerful position, both as a respectable occupation and as a control on evolution, has its own history. It was not the only division of linguistic study which was submerged in the 1800s; so was general operational analysis and its descriptive and interpretive partners. Adherents emerged here and there: such were Johan Nicolai Madvig (1804–86), speculating on case and transitivity problems; Karl Ferdinand Becker (1775–1848), whose interest was in a universal 'logic' of grammar; Heymann Steinthal (1823–99), who sought links with logic and psychology; and William Dwight Whitney (1827–94), who swerved from mainstream historicism to the social aspect of language. But only Ferdinand de Saussure's (1857–1913) timely drawing together of many such strands at the outset of the twentieth century decisively, but not immediately, switched the limelight back to nonhistorical theoretical scholarship. For the time being center-stage belonged to G-strain comparativists. Although the E-strain was for a while a separate affair (see below) it was swallowed, first by the comparative–genetic approach of Bopp, then even more forcefully by the influence of Schleicher in mid-century. (Even the narrowly comparative 1818 essay of Rask was genetic in concept.)

4. The Pioneers

Franz Bopp is a good representative of the comparative enterprise of the early nineteenth century, two of his publications being especially influential. In 1816 he produced his comparison of the morphology of the Indian verb with the equivalent details in the grammars of Greek, Latin, Iranian, and Germanic. Then, between 1833 and 1852, there appeared his fuller comparative grammar of these language-stocks, with the addition of Lithuanian; in later versions Armenian and Slavic were included. 'The factual Bopp,' as he has been called, inaugurated a genetic persuasion, especially in Germany, which some regard as a period of uninspired drudgery. But the tangible results were sizeable and mostly safe. Bopp's special contribution was the procedure of careful analysis (*Zergliederung*, literally 'dissection') of complex derived forms. To this was applied the concept that the various elements (and the complexes too) have a life to live and discernible phases of growth and decay. Not all the processes were real ones: perhaps some verbal affixes do come from cliticized pronouns, but not as many as Bopp supposed. But the 'forms of grammar,' at least in the sense of inflectional affixes, now become the critical diagnostic for the details of genetic history. Yet the 'life' simile was inherited from F. Schlegel's idea that languages are (or should be) in some sense 'organic.' Moreover, the more true they are to themselves, and harmonious in shape and function, the more they approximate to a fully organic character; and this they do by suitable laws of change (which when aiming at euphony were called the '*Wohllautgesetze*'). Just what that good word 'organic' meant to Bopp and his contemporaries, and how the biological analogy affected comparativism in those days, is discussed below. Bopp also toyed with nostraticism, trying to pull together some aspects of Indo-European and Austronesian languages.

Where Bopp was grammatical, Rasmus Kristian Rask (1787–1832) was phonological. He is famous for a prize essay submitted to the Danish Academy of Science in 1814 and published in 1818, on the genetic origin of Icelandic. That origin was taken to be an extinct form of speech which was also the source of a range of languages which Jones might well have accepted within his projected family. Rask based his views of genetic relationship on the shifts of sounds; and the two opposed emphases, the one on sounds and the other on forms, have vied for prominence ever since. Phonologies, with their phonetic base, can claim to be examined with some scientific rigor; grammars, even when contemporary, are more abstract creatures and their reasonable lines of development are matters of subjective and widely varying theories. However, sounds are too readily definable and too limited in incidence across languages, and too predictable in change in context, to be either a compelling topic when historical enquiry becomes more sophisticated or a truly useful dimension of T-strain comparison. Hence, in recent times, language typology has moved firmly into the fields of morphology and syntax, which is where it began.

5. Schleicher and the Scientists

At this stage there entered a most important figure, August Schleicher (1821–68), who in his comparatively short life made great strides in devising the methodology still employed by those who follow the genetic trade. Some say that his success lay in conflating all three 'strains' of enquiry; and certainly Schleicher's attitude was of the right combinatory kind. Specialties of emphasis marked later scholars, which undid his efforts; and the 'Neogrammarians' (see *History of Historical Linguistics*) once again demanded centrality for E-strain theorems within their new program of rigorous laws for language change. Schleicher, however, offered much else that was helpful, lasting, and of use in the workshop. He was the first to enunciate the principles that language operates by strict rules (1850: 3), that the best forms for comparison in any language are the oldest which can be traced in it (1852: iv–v), and that cross-linguistic comparison must be systematic calculation and not adventitious groping (1863: 6). As to genealogy, he pointed out that likeness of grammatical type and membership of the same family normally co-occur (as the evidence of his day suggested, anyway); but he envisaged the possibility that they might not do so (1863: ch. 1). In an article in 1853 he used the tree pattern of language descent (later reoriented into the familiar vertical form). The idea of this may be credited to scientists: in 1766 it was put forward both by Pallas in zoology and by Antoine-Nicolas Duchesne (1747–1827) in botany; but only 40 years later does the diagram turn up, in the 1801 zoology of Jean-Baptiste de Lamarck (1744–1829). Among linguists, F. Schlegel had had the concept (1808: 84); but again the figure seems not to surface (except for diagrams like those used in 1663 by J. G. Schottelius for 'Celto-Germanic' variants) until the posthumous papers of František Ladislav Čelakovský (1799–1852), after a like delay (unless one counts the realistic but amateurish panglossic tree drawn by Félix Gallet about 1800). But it was Schleicher's increasing use of the diagram from 1853 onwards which guaranteed its institutional status in language history to this day. He also faced the implication of working back to earlier, purely reconstructed, forms—namely that they must be assigned a defensible shape and context. For this reason he composed (in 1868) the notorious 'Indo-European fable,' a short animal story in proto-forms, which it is mistaken to condemn as if it were merely a virtuoso performance in that 'language.' And because such reconstructions are only coincidentally documented in that form in actual languages, as when the Greek *méne* 'stay' does probably agree with the Indo-European form, he also standardized (even if he did not invent) the practice of marking likely but still theoretical items with an asterisk. (NB: modern descriptivists use this sign to denote forms which the rules of the language cannot generate; Schleicher's starred forms can and ought to be there, but simply have not yet been documented.) Other insights of this scholar were that reconstruction within one language should precede reconstruction based on two or more compared languages (though Schlegel had already said so), and that some items may derive from more than one source (polygenesis; 1863: 23–27). On morphology Schleicher was ambivalent. He himself used it less than phonology, yet he equated the acme of a language's development with its possessing a large tally of grammatical forms as functional exploiters of a limited inventory of lexical roots. Finally, he took over from the natural scientists (in print from 1859) the actual term 'morphology,' to cover the typological study of word-structure which is concerned neither with the sound nor with the meaning of the elements but simply with the form-complexes.

For all his clear and progressive methodology, Schleicher did not please everybody. His pupil Johannes Schmidt always supported him; Theodor Siebs praised him (1902) for having injected strength into historical speculation and so made possible the salutary, if overlegalistic, stance of the Neogrammarians; and Hermann Collitz (1883) saluted his major work as supremely useful. This was the two-volume *Compendium* of 1861–62, which pulled together all that had so far been reliably discovered about Indo-European history by testable comparison and reconstruction. But if Saussure could write (1894) of *'l'essai risible de Schleicher,'* and if Whitney (1874), Max Müller (1887), and others could regard him as a 'Darwinist' who unwarrantably treated language as an animal or plant species in course of selective evolution, something has to be said of his attitude to contemporary science. Indeed, one cannot miss the strong impression made by natural science on the minds of all E-strain and G-strain linguists of the time.

6. Science as a Model

History is punctuated by scientific discoveries, as is shown by the sporadic emergence of figures like Archimedes, Galileo, Newton, or Rutherford. A background of relevant thought no doubt exists in each case but one is not encouraged to see certain epochs as specially favorable. But at the close of the eighteenth century the body of scientific data was notably richer than ever before and there was abroad a spirit of enthusiastic general enquiry. Over the next century came a remarkable succession of inventive applications and exploitations in practice and theory. It was the time to connect facts, to search for causes and to codify methods. Carl von Linné's botanical taxonomy from 1735, Antoine Laurent Lavoisier's chemistry treatise of 1789, Georges Cuvier's comparative anatomy of 1800–05, Jean-Baptiste de Lamarck's systematic zoology of 1801—all these suggested to linguists compelling analogues in their new awareness that languages grow, change, and die, and differ from one another only in explicable and even predictable ways. That is why the comparative linguistic discipline became (in Koerner's terms, 1989: 245–56) a piratical or parasitical one, more so than do the branches of natural science themselves. Some borrowed ideas are more influential than others. Harmless metaphors like 'trees,' 'roots,' 'branches,' are unimportant; wider aspects of 'genealogical' relationships are more influential (like the study of 'cladistics'—root and branch theory—cf. Hoenigswald & Wiener 1987). General laws governing the whole acceptability of biological or geological theories of evolution are another thing again. The powerful dictum of 'uniformitarianism' was put out first by James Hutton (1726–97) in 1785 and was given more publicity and muscle in the 1830–33 *Principles of Geology* of Sir Charles Lyell (1797–1875). They laid it down that neither the causes nor the stages of any process of evolution, as stated on the basis of internal or external comparison, can be qualitatively different at different times. Only what has happened, or is happening, or can be replicated, is it permissible to list as a deduced event within a thesis of past function or past change. Leibniz had said (in 1710) that one must proceed from the known to the unknown; now even the unknown must not be unparalleled among the known. William Whewell (1794–1866) may have been the first to introduce the concept into the study of language (*inter alia*), but it gained a hold there only after Wilhelm Scherer (1841–86) applied it first in 1868, more explicitly in 1875, reviewing the contribution of Whitney in 1867. Despite the practice of Cuvier or Whewell, it is not really helpful (despite Whitney 1867: 287) to insist on opposing this idea to that of 'catastrophism' in all instances. It is immaterial whether a particular historical language shift happened piecemeal and diffusively or with an abrupt 'big bang,' as long as in essence it provides an event-sequence which is previously or subsequently attested and on which its discoverer can thus rely. Also, the Hutton–Lyell law does not entail either the varying of species or the increased efficiency of succeeding types. Still, these are reasonable concomitants of the principle, and early comparative linguists accepted them within the analogy between their study and that of the natural scientists. The great catchword was 'organic.' It was brought into language debate by F. Schlegel, who saw comparative anatomy as the likeliest illuminant; and to it he opposed the term 'mechanical.' It is true that he employed the distinction in T-strain fashion (1808: 51 and passim) and considered types rather than shifts. But what was 'organic' was understood to be that which in itself contained the seeds of further development. For Bopp the diagnostic characteristic of the 'organic' was above all the ability of lexical roots to change shape for syntactic purposes in an ever more subtle way. But he added the property of inner life (with its own degrees of harmony and beauty) to the definition (1833–52: 113). In the case of Schleicher, whose early and abiding interest was in botany, the revelation was that languages relate naturally to one another as subspecies, but (as follows from the proviso above) without any necessary expectation of progressive amelioration as an aim, at least in the prehistoric evolutionary period if not in the more recent history of a language. Their forms also evolved with a natural wastefulness, and then decreased in number over time from an overgeneration of idioms (Schleicher 1860: 44); thus they were subject to a continuous decay (*Verfall*). One concludes that Schleicher was of the school of thought which, in deducing a G-strain congruence, would pronounce French to be a more recent version of Latin rather than a daughter.

Then came Darwin. The theory of natural selection was so compatible with uniformitarian thinking (and Darwin himself so complimentary to Lyell) that Schleicher appeared to be a Darwinian and to be turning comparative–genetic linguistics into a Darwinian field. His own approval of—indeed, prior inclination towards—the new evolutionism led him to call it a necessity (1863: 12) and this overshadowed his rather more judicious remark to that firm Darwinist, the zoologist Ernst Haeckel, that it is only the principles of Darwinism which can be applied to the story of language (Schleicher 1863: 31). Reaction was swift. Little more than a decade passed before linguists transformed their vague dissatisfaction with a biological—rather than the more obvious cultural–historical—slant into a harder and quite pugnacious ideology which ignored Darwin and cared nothing for causation but remained uniformitarian. It switched the object of research from being a supposed organism in itself to a (concrete) manifestation of human mental activity and behavior. The analogue of natural science progressively gave way to that of moral or cognitive science, psychology and social aspects were prized, and laws of invariable change were sought but not interpreted as natural bloom and decay. (The Neogrammarian achievements are listed elsewhere; see the next article.) Comparison was directed to actual languages and their stages, no longer to language-species alongside animal- or plant-species. Whitney and eventually Brugmann were loudest in denouncing similes involving art or nature. Actually, statements of natural (or normal) progression *were* made by the new thinkers: for example, change in morphology was held always to move from the regular to the suppleted or syncretized. And Whitney himself thought it useful to regard language as a sort of human geology (1867: 47); but variation in social parameters, and what is called below the 'diffusion' aspect, were more central to his approach.

6.1 Some Corrective Notions

Now those who were strictest in putting limits on this new comparativism did not always appreciate that it too might cross other frontiers really as wide as that between language and natural phenomena. Notably, in order to demonstrate the unfailing regularity of shifts, they relied on the invariable choice which certain dialect-speakers of Swiss German (of Kerenzen in Glarus) made of one particular value for /n/ when it occurred in speech before a velar stop. To connect this choice with change is to miscompare an articulatory fact with an historical deduction, a choice between 'tokens' (as terms in a system) with a succession over time of available 'types' (in the functional inventory of a language). The two events are causally interlinked, but they are not in the same dimension and are not direct comparanda. Furthermore, the 'regularity' of historical changes is patchy, unlike the certainty of alternants in speech at a given time; and this was made clear by the next wave of (intralingual) comparativism to arrive on the scene, that of the 'linguistic geographers.' They empirically compared in the field the different forms used for the same meaning in the same context by speakers over wide areas within what had been reasonably defined as the same language-domain. For German, Georg Wenker (1852–1911) used informants in over 40.000 school communities. For French, the Swiss Jules Gilliéron (1854–1926) and Edmond Edmont (1849–1926) considered 639 localities in France and in Francophone Alsace, Belgium, North Italy, and Switzerland. (The end-products were the respective national speech atlases.) Shifts were proved to occur at different speeds in different places, and sometimes not to occur where expected before being overtaken by another obscuring change. Differential 'diffusion' became the object of increasing attention; and after the geographic sort there later came the lexical-categorial sort. That is, comparisons of the evolutionary behavior of various words, or of various grammatical categories, over a prescribed period in a given language (with some adroit reference to similar situations in other languages) enforced the rewriting of rules of change so that they might become properly sensitive to variable susceptibility and variable speed of shift-acceptance, according to an item's status or function or frequency. This is not tidy but it is honest. It has fathered interesting general theorems: that extremes of frequency of use favor change—such is the essence of the earlier form of 'Zipf's law' (offered in 1929 by George Kingsley Zipf (1902–50) and altered less interestingly later)—or that anomalous shifts can be directly correlated with high positions on a statistical scale of occurrence, as is now claimed by Mańczak by way of explaining why in English the first vowel in *country* is unlike that of *count* or *county*, or why there is a cluster-simplification at the start of *two* but not in *twice* or *twenty*. When unusual or failing shifts are logged and a calculus of likelihood is computed over several languages, the result may be a set of conclusions on universal paths of evolution, or on sectors of major instability; and this is what Edward Sapir (1884–1939) called 'drift' in 1921.

Other interesting discoveries came from other essays in comparison. In 1932, Otto Behaghel (1854–1936) looked at the order of constituents in sentences across several languages and elaborated five laws of universal application. The most famous are those which say that new information normally follows that which is given, and that when semantically parallel elements are conjoined the shortest in extent comes first and the longest last, at least in any self-conscious idiom. Jacob Wackernagel (1853–1938) is known above all for his revelation (in 1892) that second position in a sentence is the preferred spot for enclitics, especially pronominal ones; this was deduced from Indo-European evidence but is of wide validity (although recently its scope has been much debated). Maurice Grammont (1866–1946) was the first to canvas the idea that speech sounds are naturally ranged on a cline of 'strength,' and that the weaker lose their place or their identity the more easily (by the ravages of time or derivation). Later theorists have argued over measurement, environment, persistence of strength-value, and other tactical matters; but the evidence and theorems have been multilingual. (See Collinge 1985: 243–47 on these theses.) Another version of the same comparative idea is that incorporated recently by Thomas V. Gamkrelidze, to the effect that in all languages some segment-types are inclined to be more 'dominant' and some more 'recessive,' like genes. All these conclusions are universalist in trend and not typological; they are also independent of other theories, though they may support them.

7. Tests and Critiques

There are some comparative enquiries which are unlike any of those noted above in that they specifically aim at testing and so modifying a proposal (or choosing between proposals) where the proposer has operated on too narrow a basis or even been essentially monolingual. In fact, self-apperception applied to a single (native) idiom is often positively promoted, by means of the logical figure known as the 'Chomskyan syllogism': that is, *given* that all natural languages encode a universal grammar and that *L* is a natural language, *then* such grammar is fully calculable from an informed analysis of *L* alone. This ignores the claimed selective parametrizing of universal relations in the mind of the infant learner. Moreover, recourse to cross-linguistic comparison supplies such corrective or warning suggestions as these: that the 'grammatical relations' subject, object, etc., are for certain languages better replaced by 'roles' like agent, patient, experiencer, etc.; that where Subject is applicable it is no more universally the same thing than it is universally present; that the category of case, which in any one language may be realized with a system of a mere three or four terms, needs to be sensitive to a potential macro-inventory of up to 80 values, any of which may be directly relevant to the language under analysis and can be seen distinctly realized somewhere in the world; that (to switch to semantics) the mechanics of 'speech act' models of meaning are fundamentally different as between cultures. Schleicher was sure (1850: 21–22) that there is no substitute for personal examination of any individual language of which the analysis is under debate, and he was so right.

Still, these checking studies have been post-eventum exercises. There have, however, been comparative enquiries which themselves lead to the formulation of fresh models of how languages work. This article ends with two recent instances which typify the range and justify the toil. In 1980, Paul J. Hopper and Sandra A. Thompson presented a synthesis of apparently manifold aspects of the morphosyntax of nouns and verbs in comparable structures in widely separated languages, 30 in the original article alone. The marking, variable in its placing in the sentence as well as in the category which it superficially conveyed, was convincingly declared simply to signal so many values, or positions, along a unified (and even universal) cline of 'transitivity.' As long as the alternations signal a clear degree of movement along the line between the plus and minus poles of transitivity in a fashion at once apprehensible to the native speaker, differences in comparative detail cease to obscure the cross-linguistic truth. So no surprise is to be felt when a reflexive marker turns up with an intransitive function (as when in Russian a dog which bites (in a general way) is said to 'bite itself'—compare the English intransitive verb *to enjoy oneself*), or if such a marker conveys a passive sense (as French *il s'est tué* may mean 'he got killed'), or when (as in Hungarian or Persian) the presence or choice of an affix or adposition with the object actually switches the verb's value from, e.g., 'habitual' to 'special event.' What is here noteworthy is not so much the theoretical explanation as the revelation that superficial variety can mask a fundamental identity of grammatical process. There has been much interest in the 1980s in fixing the locus of the entity which is the core of an utterance or the real 'head' of, for instance, a noun phrase. In complex noun phrases, the 1986 survey by Johanna Nichols must be very relevant. This was a review, across 60 languages, of the rival preferences for attaching markers of relation (e.g., that of possession) to what seems semantically to be the head or to what seems to be the dependent member, or even to both. The choice of marker position assists in calculating what weight a language's grammar gives to surface semantics; it also steers G-strain judgments on interlingual kinship and areal connections. In any case, it is salutary for European linguists to learn that what has traditionally been treated as the dependent item (and so marked as secondary)—like *John* in *John's book*—is in practice the bearer of the relational signal only in the minority of the world's languages.

As long as eye-opening new evidence of this sort continues to emerge as the result of assiduous comparativism, a procedure which some would like to widen to comprise also the fields of poetic language and ethnosemantics, linguistic scholarship will remain in the debt of its comparative subdivision.

Bibliography

1. Seminal Works (1786–1900) in Chronological Order

1786 Jones W (1746–94) *On the Hindus*. Third Anniversary Discourse . . . to the Asiatick Society. Repr. in: Lehmann W P (ed.) 1967 *A Reader in Nineteenth Century Historical Indo-European Linguistics*. Indiana University Press, Bloomington, Indiana

1787–89 Pallas P S (1741–1811) (ed.) *Linguarum totius orbis vocabularia comparativa*, 2 vols. Schnoor, St Petersburg. Repr. 1977 Buske, Hamburg (in Russian)

1799 Gyarmathi S (1751–1830) *Affinitas linguae Hungaricae cum linguis Fennicae originis grammatice demonstrata*. Dieterich, Göttingen (Transl. by Hanzeli V E 1983 Benjamins, Amsterdam)

1800–05 Hervás y Panduro L (1735–1809) *Catálogo de las lenguas de las naciones conocidas y numeración, división y clases de estas segun la diversidad de sus idiomas y dialectos*. Ranz, Madrid

1806–17 Adelung J C (1732–1806) *Mithridates, oder allgemeine Sprachkunde*, 5 vols. Voss, Berlin. (From vol. 2, ed. and suppl. by Vater J S) Repr. 1970 Olms, Hildesheim

1808 Schlegel F (1772–1829) *Ueber die Sprache und Weisheit der Indier*. Mohr & Zimmer, Heidelberg. Repr. with intro. by Timpanaro S 1977 Benjamins, Amsterdam

1816 Bopp F (1791–1867) *Über das Conjugationssystem der Sanskritsprache in Vergleichung mit jenem der griechischen, lateinischen, persischen und germanischen Sprache*. Andreäische Buchhandlung, Frankfurt

1818 Rask R K (1787–1832) *Undersögelse om det gamle Nordiske eller Islandiske sprogs oprindelse*. Gyldendal, Copenhagen

1830–33 Lyell C (1797–1875) *Principles of Geology*, 3 vols. Murray, London

1833–52 Bopp F *Vergleichende Grammatik des Sanskrit, Zend, Griechischen, Lateinischen, Litthauischen, Gothischen und Deutschen*. Dümmler, Berlin (3rd rev. edn. 1868–71)

1840 Whewell W (1794–1866) *Philosophy of the Inductive Sciences, Founded upon Their History*, 2 vols. Parker, London (2nd edn. 1847)

1850 Schleicher A (1821–68) *Die Sprachen Europas in systematischer Uebersicht*. König, Bonn. Repr. with intro. by Koerner E F K 1983 Benjamins, Amsterdam

1852 Schleicher A *Die Formenlehre der kirchenslawischen Sprache*. König, Bonn

1860 Schleicher A *Die Deutsche Sprache*. Cotta, Stuttgart

1861–62 Schleicher A *Compendium der vergleichenden Grammatik der indogermanischen Sprachen*. Böhlau, Weimar (3rd rev. edn. by Schmidt J, Leskien A 1870; 4th edn. 1876)

1863 Schleicher A *Die Darwinsche Theorie und die Sprachwissenschaft: Offenes Sendschreiben an Herrn Dr. Ernst Haeckel*. Böhlau, Weimar (2nd and 3rd edns. 1873)

1867 Whitney W D (1827–94) *Language and the Study of Language*. Scribner, New York

1868 Scherer W (1841–86) *Zur Geschichte der deutschen Sprache*. Weidmann, Berlin (2nd edn. 1878; new edn. by Jankowsky K R 1995 Benjamins, Amsterdam)

1891 Gabelentz G von der (1840–93) *Die Sprachwissenschaft: Ihre Aufgaben, Methode und bisherigen Ergebnisse*. Tauchitz, Leipzig (2nd edn. 1901)

2. Selected Recent Works

Bynon T, Palmer F R (eds.) 1986 *Studies in the History of Western Linguistics: In Honour of R H Robins*. Cambridge University Press, Cambridge

Christy T C 1983 *Uniformitarianism in Linguistics*. Benjamins, Amsterdam

Collinge N E 1985 *The Laws of Indo-European*. Benjamins, Amsterdam

De Mauro T, Formigari L (eds.) 1990 *Leibniz, Humboldt, and the Origins of Comparativism*. Benjamins, Amsterdam

Droixhe D (ed.) 1984 *Genèse du comparativisme indo-européen*. (= *Histoire, Epistémologie, Langage* **6(2)**). Presses Université de Lille, Paris

Hoenigswald H M, Wiener L F (eds.) 1987 *Biological Metaphor and Cladistic Classification*. University of Pennsylvania Press, Philadelphia Pinter, London

Hopper P J, Thompson S A 1980 Transitivity in grammar and discourse. *Language* **56**: 251–99

Hymes D H (ed.) 1974 *Studies in the History of Linguistics: Traditions and Paradigms*. Indiana University Press, Bloomington, Indiana

Koerner E F K 1978 *Toward a Historiography of Linguistics: Selected Essays*. Benjamins, Amsterdam

Koerner E F K 1989 *Practicing Linguistic Historiography*. Benjamins, Amsterdam

Metcalf G J 1974 The Indo-European hypothesis in the sixteenth and seventeenth centuries. In: Hymes D H (ed.) 1974

Nichols J 1986 Head-marking and dependent-marking grammar. *Language* **62**: 56–119

Robins R H 1967 *A Short History of Linguistics*. Longman, London (3rd edn. 1990)

Robins R H 1987 The life and work of Sir William Jones. *Transactions of the Philological Society* **85**: 1–23

Sebeok T A (ed.) 1975 *Historiography of Linguistics*, 2 vols. Current Trends in Linguistics, vol. 13. Mouton, The Hague

History of Historical Linguistics

N. E. Collinge

The purely historical study of language is rare. Both in antiquity and in the Middle Ages, and again in the late twentieth century, it is a subordinate preoccupation for linguists. It is at present on an upswing, but in the early-to-mid-twentieth century it was in eclipse. Even in its heyday between 1790 and 1930 the historical study of language was entwined with cultural attitudes, psychology, and language comparison. One might start with the experiment, reported by Herodotus, of the Egyptian king Psammitichus (Psamtik I) to find ethnic priority through language priority. He isolated two newborn children until they spontaneously produced their first word, which was heard as homophonous with the Phrygian term for bread. Declaring that Phrygian was the 'original' language, he apparently subscribed to a theory of inherited subconscious Urlexikon. Other rulers made similar experiments later (and subsequent notions of a single origin of languages—and even beliefs in extant versions of that original—are discussed in the preceding article). Comparing languages usually results in accepting that some are simply different stages of the same thing. Then attention moves to establishing the sets of changes which represent the history of the various lines of descent and to elaborating the general theorems which control such evolution and genetic relation.

1. The First Geneticists

Curiously, enquiry of these sorts did not occur as soon as the literary monuments of Ancient Greece and Rome gave rise to a philological profession in Western Europe from the Renaissance. The history of Greek and Latin as languages is a nineteenth-century innovation, and these languages together with Sanskrit then formed a neat triad of early comparanda. In fact, two distinct activities started in the late seventeenth century and combined to bring historical linguistics to birth. The first was a succession of compilations of words and phrases as compared across many languages, and in particular a body of evidence relating to Germanic languages. Dictionaries were produced by George Hickes (1642–1712), who linked Anglo–Saxon with 'Moeso Gothic' (1689) and later made available a wide range of north-European speech forms in his thesaurus of 1701–05; by Edward Lhuyd (1660–1709), this being of 'British tongues' (1707); by Lambert ten Kate (1674–1731), who offered in 1710 a more positive genetic relating of Gothic and Dutch; and by Johan Ihre (1707–80), this of Swedish–Gothic (1769). The other activity was prompted by a new interest in the 'inner spirit' of languages (as revealed by the varying degrees of sophistication in their grammars), which animated the influential and essentially anthropological Wilhelm von Humboldt (1767–1835). That is why during the nineteenth century the genetic-evolutionary study of language flourished above all in Scandinavia and in Germany. In the latter country post-Napoleonic nationalism, native industriousness, and strategic encouragement from the universities of Berlin and Leipzig in particular, all played a part in imposing the historical slant on language research.

Hence, the attention of E(volutionary)-strain and G(enetic)-strain scholars (for these terms see the preceding article) was naturally first directed to the Germanic languages, and especially to the emergence of High German. Some wider studies appeared: in one year (1816) François Raynouard (1761–1836) produced a history of Romance (especially Provençal), and Franz Bopp (1791–1867) published his great comparison of the verbal systems of Sanskrit and other Indo-European languages. These (with Gyarmathi's genetic work on Hungarian of 1799) fired the detective enthusiasm of those whose own aim was to locate and describe historically individual tongues, but with natural regard for familial connections, as already shown in the Fenno-Ugric family of languages. In 1818 there appeared the essay of Rasmus Rask (1787–1832) on the origin of the Icelandic language, perhaps (despite the absence of Indian evidence) the first clearly G-strain monograph of all, in Indo-European at least. Rask's contribution was to insist that a defensible prehistoric stage can be reconstructed, that sounds are the central body of evidence, and that their vicissitudes (here especially of Germanic plosive and spirant consonants) must be properly reported. But the great mouthpiece of the new profession was Jacob Grimm (1785–1863).

Grimm—(on whom see Koerner (1989: 303–32))—ranged over many fields of German culture, folklore, lexicography, and even politics; indeed, his 1848 work on the history of German is often thought to be too culturopolitical. Yet that study, and even more his four-volume *Deutsche Grammatik* (1819–37), established the framework for historical linguistics. The first volume of the latter work had a double birth, first in 1819 and then—with a new 596-page section on sounds—in 1822, after Grimm had been convinced by Rask as to the sheer usefulness of phonology. Ironically, the second version is both the most famous and the most vulnerable portion of Grimm's whole offering. He demonstrated how a presumed triad of sounds at several positions in the vocal tract was reflected in Germanic by a shifted triad; e.g., presumed /dh, d, t/ by /d, t, ƥ/. These precise phonetic values have recently been radically challenged, and many think that the relevant changes were not in pre-Germanic at all, the reverse shift having occurred in most other stocks of Indo-European. But the sets of systematic correspondences were an exciting discovery and were Grimm's own, and the relation is still widely called 'Grimm's law' (especially in the English-speaking world) since the name was first offered in 1838 (see Koerner 1989: 309 fn.3). Grimm himself thought (1822: 590) that the correspondences were merely of high frequency and he did not fret over exceptions. The conditions on his shifts were not fully explained until Karl Verner (1846–96) enunciated in 1875 the law named after him (Verner 1876), and even then some holes remained. But Grimm's renown had other bases. His is the statement of conditioned vowel modification in syllables as words are built up (*Ablaut* and *Umlaut*), as are the useful positional terms *Anlaut*, *Inlaut* and *Auslaut*, and 'strong' and 'weak' for paradigm-types. So is strict empiricism applied to the data, and the awareness that some inductive conclusions may seem more solid than they really are. He also supplied the rationale for language history, even group history: with it Friedrich Diez (1794–1876) in Romance and Franz Miklosich (1813–91) in Slavic made sense of other families. One may even see a line of descent to the group-history of Bantu languages (Meinhof), Dravidian languages (Emeneau), and the ethnography of the Amerindian tongues pursued by Sapir, Bloomfield, and now Greenberg.

Grimm's work was followed by a whole series of genetic theses. These were somewhat influenced by the revisions of methodology associated with Schleicher in the mid-nineteenth century and with Brugmann's circle in its last quarter (see below). One current was solidly German: such were the monographs and journals produced by Wilhelm Scherer (1841–86), Hermann Paul (1846–1921)—although both these also wrote general critiques of theory—Wilhelm Braune (1850–1926), Friedrich Kluge (1856–1926), and Eduard Sievers (1850–1932). Another current swept in those of a more comparative and Indo-European leaning. Of these, August Friedrich Pott (1802–87) was a phonetically aware etymologist whose *Etymologische Forschungen* (1833–36) put much trust in the roots of verbs (see Jones's dictum of 1786 in the preceding article) and insisted on proved paths of development. August Fick (1833–1916) was the first comparative lexicographer. Still, his dictionary (from 1868) fueled the false conviction that Indo-European is basically divided into two geographically distinct stocks, an Asiatic and a European. In 1863 Hermann Grassmann (1809–77) made clear the rejection in root syllables (in those Indo-European languages where the problem had not been avoided by other changes) of an aspirate feature at *both* ends. In 1868 Hugo Schuchardt (1842–1927) suggested, and in 1872 Johannes Schmidt (1843–1901) elaborated, the notion that historical changes in a family of languages move more like waves on a body of water than the branching impulses of a growing tree. Several scholars proposed, and in 1868 Scherer spotlighted, 'analogy' as a force for change. But as it seemed to interfere with expected evolution or to be unnatural, it was called 'false analogy': Brugmann (1876: 317–38) restated it as an inherent feature of human thinking. Specific pronouncements enliven this whole era, and the pronouncers were usually young (the three scholars just mentioned were each in their twenties when they first caught the world's attention). In 1870 Graziadio Isaia Ascoli (1829–1907) proved that several sorts of velar (*k*-type) sounds were to be attributed to Proto-Indo-European, although he made the tally four while later scholars have mostly preferred three or just two. Karl Verner, as noted above, explained phenomena which seemed to complicate Grimm's results on Germanic consonantism (as well as the pronunciation of sibilants), and did so by invoking the effect of presumed word-accent which was itself visible in the relevant position only in Sanskrit (Vedic). Yet any fillip to Sanskritocentric ideas was countered when between 1874 and 1879 five or six scholars—the exact time and chief author of the discovery is still debated—revealed that the Indian evidence had been affected by local palatalization of inherited velar stops in positions which also indirectly established the true set of original nonhigh vowels as, *pace* Sanskrit, /e, a, o/. Progress in Germanic was so considerable that Paul, Braune, and Sievers, all pupils of Friedrich Zarncke (1825–91), along with Kluge, helped to produce from 1891 a comprehensive survey of the linguistic history of that group. Eduard Sievers had meanwhile (1878) formulated a law about the surface behavior of Indo-European semivowels, those segments which actually turn up variously as high vowels (*i*, *u*), as on- or off-glide consonants (*j*, *w*), or as both in succession (*ij*, *uw*), according to phonetic environment.

2. The Search for Regularity

This mid-nineteenth-century epoch was overoptimistic and its scholars were too little impressed by their own shortcomings. They advocated rigor (and the efforts of Schleicher to this end are discussed in the preceding article); but their practice was less careful. It was excusable for Schlegel in 1808 to say that crucial correspondences held good merely 'oft' or 'sehr häufig' or 'nicht selten'; in 1822 Grimm might be allowed shifts which occurred usually ('in der Masse') but not always. Half a century later things should have been tightened up. Variation ought to have been given special and credible conditions, or removed entirely from historical statements. So, understandably, cleansers appeared on the scene and called uncompromisingly for excision of the anomalous. Their English title, Neogrammarians, mistranslating Zarncke's sobriquet 'Junggrammatiker' ('Young Grammarians'), misleads partly by being too bland and partly because it suggests (on the model of, e.g., Neoplatonists) that they simply gave a new twist to the docrines of an earlier but honored authority. In fact the name (alternatively *die junggrammatische Richtung*, analogical to the Young Germany movement) was intended as a reproof against their irreverence. Still, Brugmann accepted it in 1878, and in 1882 Hermann Osthoff (1847–1909) wrote (in a letter) that it would stick; but by 1890 Brugmann deplored it. They were indeed comparatively young and independent; in the traditional *annus mirabilis* of the movement (1876) the practitioners and their ages were these:

(a) *Major voices*:
    Brugmann, Karl (1849–1919), 27 years
    Delbrück, Berthold (1842–1922), 34 years
    Leskien, August (1840–1916), 36 years
    Osthoff, Hermann (1847–1909), 29 years
(b) *Close adherents*:
    Braune, Wilhelm (1850–1926), 26 years
    Kluge, Friedrich (1856–1926), 20 years
    Paul, Hermann (1846–1921), 30 years
    Saussure, Ferdinand de (1857–1913), 19 years
    Sievers, Eduard (1850–1932), 26 years
(c) *Occasional and critical subscribers*:
    Ascoli, Graziadio Isaia (1829–1907), 47 years
    Hübschmann, Heinrich (1848–1908), 28 years
    Windisch, Ernst (1844–1918), 32 years
    —and, as in a sense an inspirer,
    Whitney, William Dwight (1827–94), 49 years
    (see Koerner 1980)
    —with, as an irritant,
    Scherer, Wilhelm (1841–86), 35 years.

Their tenets, which they seem to have reached by stages (see Schneider 1973: 19–53), were these:

I. That language is an aspect of human cognition and social interaction; it is to be studied not in dusty workshops but in the light of day and on the lips of speakers (Brugmann 1878, 1897; Paul 1880). It is not an 'organic' phenomenon (Brugmann 1897).

II. That 'uniformitarianism' is desirable as a controlling subtheory: that is, 'the psychological and physiological nature of man as speaker must have been essentially identical at all epochs' (Brugmann 1878—this is a specialized version of the wider natural science thesis of Hutton & Lyell, for which see the preceding article).

III. That to properly formulated changes no contrary cases are admissible, because sound shifts (in particular) work 'according to exceptionless laws' (Brugmann & Osthoff 1878) and 'with a blind and inescapable necessity' (Osthoff 1878). Two processes alone are to be considered, exceptionless shifts and analogy (Leskien 1876). If exceptions do present themselves nonetheless, then either some principled and/or local cause is to be found or the items are to be assigned to the set of the not-yet-explained (Verner 1876; Paul 1880).

From these denials (for such they really are) these dividends of theory and practice ensue:

From I—that 'cycles' of growth, maturity, and decay must be discarded. The valid evidence is limited to actual human speech at a defined time, and to what can be deduced from it as to cognition (cf. Whitney 1867: 44).

From II—(i) that 'catastrophic' change will be absent or rare; (ii) that apparent amelioration or deterioration of a language's functioning is not necessarily related to a linear chronology; (iii) that visible contemporary changes are important evidence; (iv) that all relevant processes can be traced, measured, and stated; (v) that it is possible to establish general rules of change (e.g., that internal motivation precedes external motivation, as when gender is based on a distinction in grammar before it is related to sex—a somewhat doubtful claim by Brugmann).

From III—(i) that many earlier statements were not only leaky but actually wrong; this because (a) the input was inaccurate, and/or (b) the conditioning context was inadequate (e.g., it ignored syllabic or accentual position), and/or (c) free variation had been loosely assumed; (ii) that the residue of the not-yet-explained may be sensitive to special factors such as semantic class, frequency of use, social constraints or geographical (contact) influence. (Sadly, the Neogrammarians themselves failed to follow up these interesting positive leads.)

Earlier studies were dismissed as 'grey theories,' 'voyaging with no compass,' or 'paper linguistics.' But the Neogrammarians were themselves called mere 'slaters' of an edifice already built, because mechanistic rigor and uniformitarian attitudes were not unknown before them. But their noise frightened slack operators. They ignored the causes of change (or were positively agnostic on the matter: cf. Morpurgo Davies 1986: 164), as they did the effects of change on systems. They were not G-strain people either; rather E-strain workers plotting infallible histories. They prized contemporary evidence, but failed to see (what linguistic geographers soon gleefully pointed out) that as soon as speech-forms are plotted on maps all sorts of surprising spottinesses turn up. But positive advances were made. In 1878 Saussure in his famous *Mémoire* on the Indo-European vowels laid the foundations for a theory of lost 'co-efficients' which gave a unified account of (a) alternations of length and 'color' of extant vowels, and (b) alternating syllable-shapes, plus types of nasal insertion, which made sense of the nasal classes of the present stem of the Sanskrit verb. The details remained dark until the later 'laryngeal' theory and its many variants attacked the first problem, and Emile Benveniste (1902–76) gave proper expression to the second problem in his studies on the Indo-European root in 1935. Brugmann in 1876 set up the class of 'sonant nasals' (compare Osthoff's 'sonant liquids'), which in basic formations were consonants in value but were realized as, or supported by, vowels at the pronunciation stage. This had been somewhat foreseen by Theodor Benfey (1809–81) in 1837; also, Brugmann confused mere environmental alternants, like /ɳ, n, ŋ, ɲ/, with defensible separate protoforms—a regrettable tendency of his group. This new impetus led first to two noteworthy discussions of historical procedures (Delbrück 1880; Paul 1880 both of which moved noticeably back towards Grimm's tolerance of patchy regularity: cf. Jankowsky 1972: 198, 215; Schneider 1973: 33–35), and thereafter to the great manual on the comparative grammar of the Indo-European languages (really the inventory of the reconstructions of the original forms and the arguments for them) which is known as the *Grundriss* (Brugmann & Delbrück 1886–1900, 1916). Sound laws also proliferated; see Collinge (1985, 1995). Hugo Schuchardt denounced them (1885) and Tarbell defused them (1886); even Brugmann felt forced to withdraw his own law (of 1879, on idiosyncratic vowel lengthening in Sanskrit) when by 1913 its exceptions seemed ineradicable. In recent times that law has been largely reinstated; and all these findings do remain as valuable bases for later research, because even their overthrow assists scholarship. (For all this movement's interrelations and achievements, and its assessment, see Jankowsky 1972; Schneider 1973; Einhauser 1989.)

3. Fresh Evidence

Since those heady days research has steadily proceeded on particularities of language history, especially Indo-European. It has, of course, been subject to the law of diminishing returns. The *Grundriss* has been in effect rewritten; indeed, its chief merit always was its wide-ranging insecurity and vulnerability. The database was first extended by the discovery of 'Tocharian,' of which the first text was published in 1893 by Rudolf Hoernle (1841–1918). He thought it a form of Mongolian. But the studies of Emil Sieg (1866–1951), Wilhelm Siegling (1880–1946), and Sylvain Lévi (1863–1935) showed that the name comprises two closely related dialects, in Brahmi-type script, of the seventh and eighth centuries AD, whose home was in Xinjiang province of western China but whose connections with western (European) languages proved to be curiously thoroughgoing. Then there came the publication in 1917 by B. Hrozný (1879–1952) of the language written mostly in cuneiform on clay tablets found at Boğazköy in east central Turkey. It was seen to be a form of Indo-European of the fifteenth to thirteenth centuries BC, and is now generally known as 'Hittite.' It has three close, two more remote, and three other possible relatives (Hieroglyphic Hittite or Luwian, Luwian, Palaic; Lycian, Lydian; Carian, Sidetic, Pisidic—but ascription and genealogy vary). Thus we have the Anatolian stock, which left the main line of descent the earliest of all groups and is even taken by some to be evidence of a super-proto language ('Indo-Hittite'). In 1952 came the usually accepted recognition, by Michael Ventris (1922–56), that the language conveyed by one system of syllabic script, found on clay tablets mostly in Knossos, Crete, and at Pylos and Mycenae on mainland Greece, is a form of Greek of the sixteenth to thirteenth centuries BC. Curiously, all these new data have made possible only one general advance (as opposed to numerous corrections to previous hypotheses): namely the corroboration, from the behavior of a velar fricative in Hittite, of Saussure's suspicions as to the existence in the parent language of some segments now called 'laryngeals.' These were elsewhere lost but left traces in contiguous sounds, as in vowel quality or quantity, or in aspiration or possibly voicing or even velarization in consonants, not to mention resyllabification of roots. (On the only other, and perhaps linked, reassessment of Indo-European sounds to have found both wide acceptance and spirited resistance, the 'glottalic' theory, see Sect. 4.8.)

3.1 New Visions

Of course, optimistic reappraisals in this field are rife. As documentary resources have increased some have noticed that consonantal features often appear to vary randomly in roots at the same position: e.g., given Latin *caper* and Welsh *gafr* 'goat,' or Sanskrit *hṛd-* and Greek *kardia* 'heart,' one cannot state a single voice-value or aspirate-status in the inherited form of the initial stop in each case, not at least in terms of what seem to be the agreed correspondences. Hence, it may be that many over-careful sound laws are otiose. Another view derives all the simple vowels of Indo-European from earlier diphthongs. The most newsworthy of the revisional ideas in this family are summarized by Szemerényi (1985). They cover morphosyntax (e.g., was there at first any plural category of the noun? how many cases were there?), the lexicon, formal and social (e.g., how are numerals constructed? what were the basic kinship patterns and terms?), and the location in real time of the strata of speech-forms lying between the fifth (or, for some, even the twelfth) millennium BC and the emergence of the distinct languages. There is a recurring enthusiasm for superdivergence, drawing ever larger trees and sooner or later combining Indo-European with Kartvelian (South Caucasian), Uralic, Altaic, Dravidian, Afro-Asiatic—and even Japanese and Eskimo-Aleut, if 'megalocomparison' is pushed as far as Joseph Greenberg now seems to wish. Holger Pedersen's 'nostratic' family is ardently enlarged, and as ardently rejected by those who favor a converse process of convergence as the historical norm, whereby what are genetically unrelated and merely contiguous or intertrading idioms become fused into *Sprachbünde*, as Nikolai S. Trubetzkoy (1890–1938) suggested in a posthumous paper (1939).

4. Alternative Approaches

Not all historical study since Brugmann has been confined to seeking new data, refining the early inventory and the shift-statements, or promoting the con- or the di-vergent faith. Despite a 30-year period of positive discouragement (c.1935–65), the twentieth century has contributed much powerful thinking on the general methods of 'diachronic' research and on the causes and mechanics of language change. The relevant essays will be mentioned roughly in chronological order—only roughly so, because each tends to ebb and flow with fashion and, anyway, they overlap.

4.1 The Rules of the Game

One urge is to offer a defensible formalism of methodology; that is, to make what historians do appear scientifically respectable. Much headway has been made over many years by Henry M. Hoenigswald (see his work of 1950, 1960; also the reference to 'cladistics' in the preceding article). He has defined the comparanda, the act of comparison, and the valid reconstruenda; and he has diagramed the relevant inductive and abductive conclusions. Sixty years ago Evgenij D. Polivanov (1891–1938) did similar work, at least in focusing on the tracing of mergers (those often irreversible fusings of two or more originally distinct terms in, e.g., a sound system—a central aspect of language history). An attack on the uncertainties, rather than the (im)proprieties, of shifts is found in the series of attempts to plot a determinable path for analogical changes, especially by Jerzy Kuryłowicz (1895–1978) and Witold Mańczak. The rules suggested for handling the causes and effects of analogy, the second great controller of linguistic evolution, are well set out and evaluated by Hock (1986: 210–37). Analogy repeatedly attracts scholars' attention: cf. Anttila (1977). So does the need to establish what is 'natural' in change (cf. Dressler 1982).

4.2 Expected Shifts in Grammar

Another set of general rulings is causal in aim and functional in scope. In the early nineteenth century change had been seen as the outward aspect of a natural movement towards ever improved and more sophisticated forms of speech. An early twentieth century counterpart was pressed by Edward Sapir (1884–1939) under the name of 'drift.' His claims (1921: ch. 7) were (a) that some types of change can be relied upon to occur in any history (so analytic grammar will always take over from synthetic, producing e.g., phrasal verbs, prepositional uses, invariable words in careful ordering); and (b) that the new mechanisms are bound to be more durable as well as more serviceable than the old. Robin Lakoff (1972) wisely preferred to see a two-way fluctuation between the analytic and synthetic states; clearly, synthetizing recurs, as when Romance forms like French *chanterai*, Italian *cantarò* develop from Latin *cantare habeo/aueo*. Others study the basic patterns which occur in the relating of a verb to the major 'arguments' which stand with it in a sentence. Any 'subject' may be shown to be the more controlling item and any 'object' the more controlled ('accusative' syntax); or the argument most intimately associated, in any role, with the verb's action may be shown to be so, with other marking reserved for the mere instigator ('ergative' syntax); or the formal differences may indicate no more than that the verb–argument relation reflects an activity rather than a state ('active' syntax). Some 'alignment typologists' would claim that these sentence-types, in the order active → ergative → accusative, represent an inevitable progress towards increasingly subtle, adroit, and stable patterns of syntax. Another approach of the same optimistic persuasion, but more decidedly teleological, points to how several superficially unconnected changes combine to produce a single desired generalization. Thus a simplifying of consonant-clusters and/or the insertion of vowels into the clusters and/or the reordering of plosives and liquids (so that /-VrtV-/ becomes /-VtrV-/) and/or the loss of word-final consonants—any or all of these reflect the same thing, a switching of the language so as to favor open syllables. Such linked events are called 'conspiracies.' A notable recent example is the 'constituentization' notion of Nigel Vincent (see the report by Smith 1989: 302): the claim is that several novelties differentiating the Romance languages from classical Latin—the definite article, the separated tense/mood marker, the conjunction signaling a 'reported speech' complement (so that *hominem fecisse* passes to *que l'homme a fait*)—are only various aspects of a single policy of revision, a clear representation of the item newly regarded as the real 'head' of the relevant constituent, whether of noun-phrase or verb-phrase or embedded sentence. André Martinet's ideas (1955) of functional economy remain relevant here.

4.3 The Generative Strategy

After the war of 1939–45 American structural linguistics moved into its generative phase. Thereafter it was the canon to take a language's forms from matrix arrays of features, combine and order them into sequences, perhaps transform the interim result, and so generate the permissible sentences. The triggers were rules, of strictly defined input and environment, arranged in their own recognized orderings. The concept was clearly analogous to historical change and its handling by 'laws' (as Frank Tarbell foresaw long ago, 1886: 9). Conversely, a historical shift could be presented as here the insertion, there the deletion, of a rule or else as a change in rule ordering or context. The catchword was 'simplification.' Among the practitioners were Morris Halle (1962), Robert D. King (1969), and Paul Kiparsky (1965, 1968). This strategy, however, demands that operational economy is a consistent aim of speakers, and that economy can always be recognized when presented. However, the problem remains of how to calculate infallibly whether, for instance, modern English *wore* (as preterite of *wear*) is more, or less, simple within the grammar of the verb than is earlier English *werede* (i.e., *weared*). On these scores optimism has rather faded.

4.4 Transparency

Yet some generativists, and even some Chomsky-aware traditionalists, have resorted to a causal factor which was already considered in the nineteenth century. If rules (given that they exist) are reordered too much, or if their output becomes too distant from their input, the native speaker will lose any sense of transparency in the derivation. A speaker's competence can tolerate only so much opacity. Then, remedial change is eventually to be expected and may be quite radical. Kiparsky proposed (1971: 623) that rules tend to shift in their order to maximize transparency. Vennemann (1975) explained 'drift' afresh, as the renewal of syntactic clarity by improved ordering of items: thus the order Subject–Verb–Object arose after affixes had been eroded and so, in an order where Subject and Object were juxtaposed, there was doubt when the S-phrase ended and the O-phrase began. David Lightfoot (1979) offered a Transparency Principle: that derivations be minimally complex and that underlying and surface structures be recognizably alike. When child-learners then impose a therapeutic restructuring, their new grammar should not destroy intercommunication, but the system-changes may have been radical. This is 'catastrophic' change. (That improvement is always the cause of change has been argued, as recently by Vennemann 1988.)

4.5 The Speed of Change

A necessary conclusion from both the 'rule-change' and the 'back-to-transparency' schools of thought is that change is not gradual, at least in origin. Sounds will not move slowly in speakers' mouths through intermediate positions into a new configuration nor will patterns of syntax coexist; and originators or early accepters of changes will not behave inconsistently. These are reassertions of neogrammarian principles. Actually, the second is not safe. One finds inconsistency in speakers; and it is a minor historical, but may be a major sociological, indicator. Originators may not behave uniformly, and adopters' 'assent can be but slowly gained' (Whitney 1867: 44). For example, during the democratizing of Greece between 1975 and 1985 (but less markedly now) the use of *dhimotiki* idioms to the exclusion of *katherevusa* across all contexts was recorded as much spottier among the less politically committed (and especially older or female) speakers, whose rules were distinctly variable. This may be only a regular aspect of the heterogeneity normal in all speech communities and speakers. But in one respect change is indeed gradual: it spreads from limited contexts like a contagion across the vulnerable words of a language. 'Lexical diffusion' is a norm, as Whitney suspected in 1894; and William S-Y. Wang (1977) has led the way in charting it, as in the slow extension of nasalization in Chinese or the uneven loss of vowel-length as a word distinguisher in French. Some parts of the lexicon resist for ever: hence the otherwise suspicious alternation between a shift and its absence, as with Celtic initial *s-* or *h-* for inherited **s-*, or one reflex rather than another, as with the Germanic variation of voiced and voiceless forms of initial plosives.

4.6 Grammaticalization

A more positive mechanism is currently in favor. Whitney said in 1885 (p.770) that every formative element goes back to some previously existing independent word; and the notion that morphological markers derive from lexical or freestanding syntactical items was publicized in 1912 by Antoine Meillet (1866–1936). The words have referential meaning bleached out of them and pass, usually by way of a clitic stage, to being mere affixes of tense or class or the like. In the creole language Tok Pisin of Papua New Guinea *baimbai* (cf. English *by and by*) reduces from free adverb, via '*bai*,' to a future tense prefix as in *embigo* 'he'll go.' The Romance languages owe their adverbial suffix *-ment*, *-mente* to a similar process with the Latin (ablative) noun *mente* 'in (with) mind,' as in *tota mente* 'wholemindedly.' The name of this game is 'grammaticalization,' and its enthusiasts are numerous. Talmy Givón's apt slogan (1971) was 'today's morphology is yesterday's syntax,' and this is the synthetizing converse of drift (which favors the move to analytic expressions) and of degrammaticalization, which does occur. But the history of morphology has room for both and proceeds in concertina fashion.

4.7 The Social Impulse

Whitney's interest also encompassed the social aspects of language. Many sociolinguists now study the deliberate adherence of individuals to the prestige speech-forms of the group of which they wish to be recognized as members, and their consequent conscious choice between competing expressions at all linguistic levels. Then it follows that, as language is manipulated as a tool of social integration, it will suffer local change. Within groups natural heterogeneity will diminish, and widening acceptance will transform the local switch into the global; and that is what historical change is. Given that speakers vary their forms by sensitivity to speech-act participants (the cline of solidarity) and according to the situation (the cline of formality), as well as unconsciously because of personal background (the socioeconomic scale), the important questions are: (a) how is all this variety realized? and (b) how can the variants be spread and then fixed as new norms? On this whole sector enlightenment will be found in the researches of, e.g., William Labov, Suzanne Romaine, and Peter Trudgill. Labov (1982) reconsidered the problems attendant on this 'social adjustment' view. He identified five: (a) 'constraints,' or what determines whether a change is possible? (b) 'transition,' or what is the path of change? (c) 'embedding,' or what effect does change have on systems? (d) 'evaluation,' or how do speakers react to change? (e) 'actuation,' or why *that* change, why *then*, why *there*? In 1890 Gabriel de Tarde (1843–1904) said of social imitation 'l'aimant copie l'aimé,' and assimilation to a cult figure or to the heroes of a political movement (or merely of a motorcycle gang) is easy to understand. Moreover, some strata of society seem to be naturally more insecure or ambitious, and so more open to speech variation, than others. But the Labovian type of enquiry does not reveal the precise dynamic of general change-acceptance (and the role of women is not consistently described). Progress on these matters has been made by Lesley and James Milroy, whose close analysis of Belfast speech patterns was based on careful integration of observer with observed, and was pursued across several communities of significantly different religion, affluence, and mobility. They claim the key factor to be the 'social network.' Each speaker operates within one or more such networks, webs of personal contacts in crucial aspects of everyday life. Where a speaker connects with several of these webs, but so has a comparatively weaker commitment to each, choices are less fixed but shift-potential is greater. These 'weak tie' but multinetwork individuals are innovators of generalized change insofar as they are the transmitters of variants across the whole community; and, when mobile, females are powerful transmitters. This kind of solution tends to be promoted by the socially interested as the exclusive historical model (a workshop at Poznań was devoted to it in 1983 and the results reported in *Folia Linguistica Historica* **1** (1985); note also J. Milroy 1992). But many past shifts can never now have their social prompting laid bare. Besides, one can document changes which were indisputably the result of authoritarian ruling, or of language-contact, or of literary influence, to name a few possibilities which are not normally linked to 'society.'

4.8 Typology and History

Typology, with its long and spasmodic history, is the subject of a separate article (ordering and 'alignment' typology has been noted above). Its application to historical linguistics is mostly as a check on speculative reconstruction. The most newsworthy instance of the second half of the twentieth century is the radical revision of the series of plosive consonants to be attributed to Proto-Indo-European, prompted by the objection to the traditional inventory which Roman Jakobson (1896–1982) raised in 1957. He remarked that a reconstruction, at different articulatory positions, of a voiced aspirate stop alongside a contrast of plain voiced and plain voiceless stops should entail not only a separate /h/ segment but especially the 'inclusion' or 'substitution' of a voiceless aspirate stop (a class which the evidence indicates to be sporadic and/or late in the Indo-European languages); otherwise it will set up a system unheard of in the world. This judgment (Jakobson 1958) was empirical; hence attempts have been made to falsify it by finding the denied system (i.e., lacking the voiceless aspirates) in a modern idiom. The most trustworthy instance seems to be that in a dialect (Bario) of an Austronesian language, Kelabit. But Kwa (Niger-Congo) languages seem to show it also. Its extreme rarity is more damaging than complete absence (which might only mean careless search). Conservatives insist that proto-languages are not subject to typological testing because they comprise reconstructions of differing time-depths and degrees of certainty, and are incomplete anyway. Others say that typology itself has not yet become sufficiently subtle or farseeing. But the voiced aspirate segment is phonetically awkward (note the odd momentary interruption of voicing in a sequence of the form /-Vd^{h}V-/); and the plain voiced set itself had long seemed curiously constrained (quite apart from the overall rarity of /b/) in use in Indo-European roots and affixes, as well as sometimes oddly affecting contiguous vowels. So several new hypotheses have been offered. Their commonest link is (oddly) the replacing of the plain voiced pulmonic stops by glottalic ejectives, these being originally voiceless (the expelled pharyngeal air is never in the working glottis) but apparently reflected by voiced nonglottals in ten out of the twelve Indo-European stocks—to the loud disbelief of many (see especially Michael Job in Vennemann 1989: 123–36). The idea was floated by André Haudricourt in 1948 and André Martinet in 1953; it is usually called the 'glottalic theory.' (Much is written on it in Vennemann (1989) alongside the 'laryngeal theory,' since both treat of lost infrabuccal articulation; for its effects on traditional 'laws' of change, see Collinge 1985: 259–69; for attempts to relate the ejectives rather to the old *voiceless* pulmonics, see Rasmussen and Vennemann in Vennemann 1989: 153–176, 231–244; and for the best overall view, see Salmon 1993.)

4.9 Languages in Contact

It seems obvious that languages must change when their speakers are in contact with those of other languages. Many such events were made clear by Uriel Weinreich's *Languages in Contact* (1953). 'Areal linguistics' and the convergence theory rest on this premise. In this regard the role of pidgin and creole (i.e., naturalized pidgin) languages has been investigated by Derek Bickerton, Peter Mühlhäusler, and others. But in their special study of creolized languages in transgenetic evolution, Sarah Thomason & Terrence Kaufman (1988: especially ch. 8) concentrate on those creoles which in some respect have never had a pidgin stage at all ('abrupt creolization'). It seems that their relation to affecting languages may be positive in the lexicon but quite negative in the grammar. Thus they may ultimately supply proof of that which has so far been thought to be unprovable, namely that two given and somewhat similar languages are *not* genetically related.

5. 'Linguistic Palaeontology'

A last, perennially absorbing, aspect of language history is the deduced anthropology of the speakers of a genetic group, hopefully reconstructed in the time, ambience, and society of the users of the still undivided proto-language. Every fresh idea as to the real nature of the proto-language rekindles it. Arguments about the Indo-Europeans as a people—for this is by far the most favorable field for such studies, given the relatively enormous amount of linguistic data and research—have been based, since Adolphe Pictet's (1799–1875) efforts of 1859–63 on the 'linguistic palaeontology' of the family, on natural onomastics (especially plant and animal names), on kinship terminology, and on theories of central and marginal speech communities in the larger family. In addition, there have been attempts to fit archaeological finds (e.g., typical dwellings or burial sites) to feasible lexical reconstructions. Past locatings of the Indo-European homeland have included (in wide terms) India, Asia, and Scandinavia and (more narrowly) Lithuania, Hungary, or North Germany. Late twentieth-century placings do seem to be at last narrowing the choice of general area, and they are:

1956 Dnieper–Volga basin (Gimbutas)
1976 Africa (Merlingen)
1980, 1984 Van–Urmia region (Gamkrelidze & Ivanov)
1982 Black Sea environs (Kilian)
1984 Balto-Slavic area (Mańczak)
1985 Balkan–Carpathian area (D'iakonov)
1987 Central Anatolia (Renfrew)
1989 Pontic–Caspian region (Mallory)
1990 Eastern Ukraine (Kortlandt)
1991 Eastern Europe (Anthony)

—where for the most part a Black Sea–Caspian axis seems to prevail, not too removed from the early ideas of Otto Schrader (1855–1919). (On this see Mallory 1989; and the *Journal of Indo-European Studies*, passim.) Even so, it would be unwise to pin one's faith to any solution so far suggested. Although Indo-European alone has provided enough data, and a challenging geographical spread, for this sort of debate, its scholars cannot be said to have forged, for all their efforts, any compelling modus operandi or paradigm answer for the attention of students of other language families.

Bibliography

1. Seminal Works of the Eighteenth and Nineteenth Centuries in Order of Publication:

1703–05 Leibniz G W (1646–1716) *Nouveaux essais sur l'entendement humain.* Schreuder, Amsterdam (1st Publication, Raspe R E (ed.) 1765; transl. by Langley A G 1884; 3rd edn. 1949 Open Court, La Salle, Illinois)

1710 ten Kate L (1674–1731) *Gemeenschap tussen de gottische spraeke en de nederduytsche vertoont.* Rieuwertsz, Amsterdam

1769 Ihre J (1707–80) *Glossarium Suio Gothicum.* Edmann, Uppsala

1786 Jones W (1746–94) *On the Hindus.* Third Anniversary Discourse . . . to the Asiatick Society. In: Jones A M (ed.) 1799 *Works.* Robinson, London. Repr. in Lehmann W P (ed.) 1967 *A Reader in Nineteenth-century Historical Indo-European Linguistics.* Indiana University Press, Bloomington, Indiana

1799 Gyarmathi S (1751–1830) *Affinitas linguae Hungaricae cum linguis Fennicae originis grammatice demonstrata.* Dieterich, Göttingen (Transl. and annot. by Hanzeli V E 1983 Benjamins, Amsterdam)

1808 Schlegel F (1772–1829) *Ueber die Sprache und Weisheit der Indier.* Mohr & Zimmer, Heidelberg. Repr. with intro. by Timpanaro S 1977 Benjamins, Amsterdam

1818 Rask R K (1787–1832) *Undersögelse om det gamle Nordiske eller Islandiske sprogs oprindelse.* Gyldendal, Copenhagen

1819–37 Grimm J (1785–1863) *Deutsche Grammatik* (vol. I 1819–1822; vol. II 1826; vol. III 1831; vol. IV 1837). Dieterich, Göttingen. (Rev. by Scherer W, et al. 1870–98 Bertelsmann, Berlin)

1833–36 Pott A F (1802–87) *Etymologische Forschungen auf dem Gebiete der Indo-Germanischen Sprachen*, 2 vols. Meyer, Lemgo (2nd rev. and enlarged edn. in 10 vols. 1859–76)

1848 Grimm J *Geschichte der deutschen Sprache*, 2 vols. Weidmann, Leipzig

1859–63 Pictet A (1799–1875) *Les origines indo-européennes ou les aryas primitifs*, 2 vols. Cherbuliez, Paris (Rev. edn. 1877)

1861–62 Schleicher A (1821–68) *Compendium der vergleichenden Grammatik der indogermanischen Sprachen*, 2 vols. Böhlau, Weimar

1867 Whitney W D (1827–94) *Language and the Study of Language.* Scribner, New York

1868 Scherer W (1841–86) *Zur Geschichte der deutschen Sprache.* Weidmann, Berlin (New edn. by Jankowsky K R 1995 Benjamins, Amsterdam)

1870 Ascoli G I (1829–1907) *Corsi di glottologia.* Loescher, Turin

1870–71 Fick A (1833–1916) *Vergleichendes Wörterbuch der indo-germanischen Sprachen.* Vanden-hoeck & Ruprecht, Göttingen

1876 Brugmann K (1849–1919) Nasalis sonans in der indogermanischen Grundsprache. *Curtius' Studien* **9**: 285–338

1876 Leskien A (1840–1916): *Die Declination im Slawisch-*

Litauischen und Germanischen. Jablonowski, Leipzig. Repr. 1963 Zentral-Antiquariat, Leipzig

1876 Verner K (1846–96) Eine Ausnahme der ersten Lautverschiebung. *Kuhns Zeitschrift* **23**(2): 97–130

1878 Saussure F de (1857–1913) *Mémoire sur le système primitif des voyelles dans les langues indo-européennes.* Teubner, Leipzig, Re-issued 1922 in: *Receuil des publications scientifiques de Ferdinand de Saussure.* Sonor, Geneva

1880 Delbrück B (1842–1922) *Einleitung in das Sprachstudium.* Breitkopf & Härtel, Leipzig (Transl. by Channing E 1882; new edn. by Koerner E F K 1974 Benjamins, Amsterdam)

1880 Paul H (1846–1921) *Principien der Sprachgeschichte.* Niemeyer, Halle

1885 Schuchardt H (1842–1927) *Ueber die Lautgesetze—gegen die Junggrammatiker.* Oppenheim, Berlin (Transl. in: Vennemann T, Wilbur T H (eds.) 1972 *Schuchardt and the Neogrammarians and the Transformational Theory of Phonological Change.* Athenäum, Frankfurt)

1886–1900 Brugmann K, Delbrück B *Grundriss der vergleichenden Grammatik der indogermanischen Sprachen,* 5 vols. Trübner, Strasbourg (Vol. I 1886; vol. II 1892; vols. III–V 1893–1900; 2nd edn. without syntax 1897–1916; shortened version 1904)

2. Surveys of Progress and Problems

1869 Benfey T (1809–81) *Geschichte der Sprachwissenschaft und orientalischen Philologie in Deutschland.* Cotta, Munich. Repr. 1965 Johnson, New York

1892 Bechtel F (1855–1924) *Die Hauptprobleme der indogermanischen Lautlehre seit Schleicher.* Vandenhoeck & Ruprecht, Göttingen

1924 Pedersen H (1867–1953) *Sprogsvidenskaben i det nittende Aarhundrede: metoder og resultater.* Gyldendal, Copenhagen (Transl. by Spargo J W 1931 *Linguistics in the 19th Century.* Harvard University, Cambridge, Massachusetts; reissued 1962 as *The Discovery of Language,* Indiana University Press, Bloomington, Indiana)

1972 Jankowsky K R *The Neogrammarians.* Mouton, The Hague

1989 Koerner E F K *Practicing Linguistic Historiography.* Benjamins, Amsterdam

3. Special Studies

Anttila R 1977 *Analogy.* Mouton, The Hague

Benveniste E 1935 *Origines de la formation des noms en indo-européen.* Maisonneuve, Paris

Collinge N E 1985 *The Laws of Indo-European.* Benjamins, Amsterdam

Collinge N E 1995 Further laws of Indo-European. In: Winter W (ed.) *On Languages and Language.* Mouton de Gruyter, Berlin

Dressler W U 1982 A semiotic model of diachronic process phonology. In: Lehmann W P, Malkiel Y (eds.) *Perspectives on Historical Linguistics.* Benjamins, Amsterdam

Einhauser E 1989 *Die Junggrammatiker.* Wissenschaftlicher Verlag, Trier

Givón T 1971 Historical syntax and synchronic morphology: An archeologist's field trip. *Papers from the 7th Annual Meeting of the Chicago Linguistic Society.* Chicago Linguistic Society, Chicago, Illinois

Halle M 1962 Phonology in generative grammar. *Word* **18**: 54–72. Repr. in: Fodor J A, Katz J J (eds.) 1964 *The Structure of Language.* Prentice-Hall, Englewood Cliffs, New Jersey

Hock H H 1986 *Principles of Historical Linguistics.* Mouton de Gruyter, Berlin

Hoenigswald H M 1950 The principal step in comparative grammar. *Language* **26**: 357–64

Hoenigswald H M 1960 *Language Change and Linguistic Reconstruction.* Chicago University Press, Chicago, Illinois

Jakobson R 1958 Typological studies and their contribution to historical comparative linguistics. *Proceedings of the 8th International Congress of Linguists,* Oslo 1957: 17–24. Repr. 1962 in: *Selected Writings I*

King R D 1969 *Historical Linguistics and Generative Grammar.* Prentice-Hall, Englewood Cliffs, New Jersey

Kiparsky P 1968 Linguistic universals and linguistic change. In: Bach E, Harms R W (eds.) *Universals in Linguistic Theory.* Holt, Rinehart & Winston, New York

Kiparsky P 1971 Historical linguistics. In: Dingwall W O (ed.) *A Survey of Linguistic Science.* University of Maryland Linguistics Program, College Park, Maryland

Koerner E F K 1980 L'importance de William Dwight Whitney pour les jeunes linguistes de Leipzig et pour F. de Saussure. *Lingvisticae Investigationes* **4**: 379–94

Labov W 1982 Building on empirical foundations. In: Lehmann W P, Malkiel Y (eds.) *Perspectives on Historical Linguistics.* Benjamins, Amsterdam

Labov W 1994 *Principles of Linguistic Change (Vol. I).* Blackwell, Oxford

Lakoff R T 1972 Another look at drift. In: Stockwell R P, Macaulay R K S (eds.) *Linguistic Change and Generative Theory.* Indiana University Press, Bloomington, Indiana

Lightfoot D W 1979 *Principles of Diachronic Syntax.* Cambridge University Press, Cambridge

McMahon A M S 1994 *Understanding Language Change.* Cambridge University Press, Cabmridge.

Mallory J P 1989 *In Search of the Indo-Europeans.* Thames & Hudson, London

Martinet A 1955 *Economie des changements phonétiques.* Francke, Berne

Meillet A 1912 L'évolution des formes grammaticales. *Scientia* **12**: 384–400. Repr. 1921 in: *Linguistique historique et linguistique générale I.* Champion, Paris

Milroy J 1992 *Linguistic Variation and Change.* Blackwell, Oxford

Milroy J, Milroy L 1985 Linguistic change, social network and speaker innovation. *Journal of Linguistics* **21**: 339–84

Morpurgo Davies A 1986 Karl Brugmann and late nineteenth-century linguistics. In: Bynon T, Palmer F R (eds.) *Studies in the History of Western Linguistics.* Cambridge University Press, Cambridge

Morpurgo Davies A 1994 La linguistica dell' Ottocento. In: Lepschy G C (ed.) *Storia della Linguistica III.* Il Mulino, Bologna

Nerlich B (ed.) 1989 *Linguistic Evolution* (=*Lingua* **77(2)**). North Holland, Amsterdam

Salmon J C 1993 *The Glottalic Theory: Survey and Synthesis.* JIES monograph series 10. Institute for the Study of Man, McLean Virginia

Sapir E 1921 *Language.* Harcourt Brace, New York (Esp. ch. 7, but see Malkiel Y *Language* **57**: 535–570—1981)

Schneider G 1973 *Zum Begriff des Lautgesetzes in der Sprachwissenschaft seit den Junggrammatikern.* Narr, Tübingen

Smith J C 1989 Report on the Ninth International Conference on Historical Linguistics (9th ICHL). *Diachronica* **6**: 301–307

Szemerényi O 1985 Recent developments in Indo-European linguistics. *Transactions of the Philological Society* **83**: 1 71

Tarbell F B 1886 Phonetic law. *Transactions of the American Philological Association* **17**: 5–16

Thomason S G, Kaufman T 1988 *Language Contact, Creolization, and Genetic Linguistics*. University of California Press, Berkeley, California

Vennemann T 1975 An explanation of drift. In: Li C N (ed.) *Word Order and Word Order Change*. University of Texas Press, Austin, Texas

Vennemann T 1988 *Preference Laws for Syllable Structure and the Explanation of Sound Change*. Mouton de Gruyter, Berlin

Vennemann T (ed.) 1989 *The New Sound of Indo-European*. Mouton de Gruyter, Berlin (See rev. article by Szemerényi O *Diachronica* **6**: 237–69)

Wang W S-Y 1977 *The Lexicon in Phonological Change*. Mouton, The Hague (See also article with Chen M Y *Language* **51**: 255–81)

Whitney W D 1885 Philology: Part I; Science of language in general. *Encyclopaedia Britannica*, 9th edn., vol. 18: 765 80. Black, Edinburgh

4. Reference Works

(i) PERIODICALS

(1852–   ) *Zeitschrift für vergleichende Sprachforschung* (renamed *Historische Sprachforschung*, from vol. 101, 1988)
(1891–   ) *Indogermanische Forschungen*
(1949–   ) *Kratylos*
(1973–   ) *Journal of Indo-European Studies*
(1980   ) *Folia Linguistica Historica*
(1984   ) *Diachronica*

(ii) SURVEYS AND DIGESTS

(a) 'Indogermanische Chronik': appears regularly in *Die Sprache* (1949–   , Vienna and Wiesbaden)

(b) Review series edited by Jacek Fisiak (Mouton, The Hague; later Mouton de Gruyter, Berlin):
  1978 *Recent Developments in Historical Phonology*
  1980 *Historical Morphology*
  1984 *Historical Syntax*
  1985 *Historical Semantics and Historical Word Formation*
  1988 *Historical Dialectology: Regional and Social*
  1990 *Historical Linguistics and Philology*
  1995 *Historical Linguistics and Typology*

(iii) CONFERENCES of the *International Society for Historical Linguistics*, with published *Proceedings* (vols. I, II North Holland, Amsterdam; from vol. III onwards, Benjamins, Amsterdam):

I 1973 Edinburgh
II 1976 Tucson, Arizona
III 1977 Hamburg
IV 1979 Stanford, California
V 1981 Galway
VI 1983 Poznań
VII 1985 Pavia
VIII 1987 Lille
IX 1989 New Brunswick, New Jersey
X 1991 Amsterdam
XI 1993 Los Angeles, California
XII 1995 Manchester
XIII 1997 Düsseldorf
XIV 1999 Vancouver, B.C.

History of Typology and Language Classification

E. F. K. Koerner

1. The Prehistory of Language Classification and Typology

Of the two subjects, the history of language classification is the much older one; it can be traced back to early thirteenth-century attempts concerned with establishing genetic relationships among languages (cf. Bonfante 1953). However, only after the biblical concept of an Adamic language giving rise to all other languages of the world had been disposed of, could empirical investigations about the similarity and dissimilarity of languages be pursued much more seriously (e.g., Metcalf 1974). The short *Diatriba de Europaeorum linguae*, written in 1599 by the Leiden professor Joseph Justus Scaliger (1540–1609), is usually cited as an early example of genetic classification. Scaliger established, apart from Greek which was frequently seen as the source language of Latin, the Romance, Germanic, and Slavic language families on the basis of vocabulary items shared among the languages belonging to the particular group, e.g., the word for 'god' (*deus*, *god*, and *bog*, respectively). But there was no hint in his essay that these three families in turn were related. However, several generations before him, the Czech Sigismund Gelenius (1497–1554) had shown, in a comparative dictionary published in 1537, that Greek, Latin, Germanic, and Slavic were indeed related. Apart from frequent biases in favor of European languages, these taxonomies reached their erstwhile conclusion in Johann Christoph Adelung (1732–1806) and Johann Severin Vater's (1772–1826) 4-volume *Mithridates* (1806–17), in which he distinguished between mono- and polysyllabic languages and cataloged all languages around the world on this basis as well as according to their geographic location. This hardly amounted to more than word lists and sample texts, not unlike what could be found already in Konrad Gesner's (1514–65) *Mithridates* of 1555, for example. Progress in matters of scientific principles of language classification, by genetic affiliation or typological structure, was slow. These eighteenth-century collectors of languages, it would seem, emulated the Linnean model and were satisfied with classification pure and simple (cf. Picardi 1977); it was no accident that the chief editor of the enterprise undertaken at the behest of Catherine II of Russia, Peter Simon Pallas (1741–1811), was a naturalist, in particular a botanist (cf. Koerner 1989: 270–271, 356).

2. Classical Typology of Language

The situation changed from 'linguistic botanizing' and superficial taxonomy toward more sophisticated attempts at language typology only in the nineteenth century, when Friedrich Schlegel (1772–1829), following up on Sir William Jones's celebrated observations of 1786 concerning the relationship between Sanskrit and the major European languages, sketched a program of comparative–historical research in his *Ueber die Sprache und Weisheit der Indier* in order, he said (Schlegel 1808: 84), to replace previous speculation about the origin of language by proper historical investigation. In the same work, Schlegel, one of the most influential early nineteenth-century linguistic thinkers, also developed a typological framework to establish genetic relationships generally (*ibid.*: 44–59), though his focus remained the establishment of the Indo-European language family. Given Schlegel's impact on subsequent development in historical or genetic as well as comparative linguistics in the nineteenth century, these typological proposals had an influence on subsequent work as well, producing in effect a third line of research, the typological. At least in Schlegel's (1808) work these three lines, the genetic-strain, the comparative-strain, and the typological-strain of linguistic analysis, did frequently overlap (see the articles on *History of Historical Linguistics* and *History of Comparative Linguistics*); they were merely different approaches to one and the same goal: the establishment of the Indo-European language family as distinct from all other languages. Even Franz Bopp (1791–1867), the founder of comparative–historical Indo-European linguistics, appears to have resorted to typological arguments (Lehmann 1991).

Like much other scientific work in the study of language, linguistic typology, though essentially developed during the nineteenth century, appears to have had forerunners. Coseriu (1983) for instance referred to a 40-page essay on 'original' and 'compounded' languages of 1761 by the political economist Adam Smith (1723–90) as the source for Friedrich Schlegel's typological classifications since his brother August Wilhelm (1767–1845), referred to Smith in his own effort at language typology of 1818. Coseriu did not realize, however, that the Smith mentioned in Friedrich Schlegel (1808: 81n) was certainly not the economist (Plank 1987; Koerner 1989: 272–73 n.3). In fact, August Wilhelm Schlegel mentions Adam Smith only in a reference to an 1809 French translation of the linguistic portion of Friedrich's book (A. W. Schlegel 1818: 85 n.6), which had been published together with a translation of Smith's essay. In his 1818 monograph August Wilhelm gives full and exclusive credit to his brother's exposé, at the same time introducing a further subgrouping on the basis of the introduction of an 'analytic'/'synthetic' distinction.

Others (e.g., Noordegraaf 1977; Kaltz 1980) have pointed to Gabriel Girard's (1677–1748) distinction of 1747 between '*langues analogues*' and '*langues transpositives*' as the immediate source of Smith's 'compounded'/'uncompounded' dichotomy, but without proving that Girard had any influence on either of the Schlegels. (That the schemes of Girard, Smith, and the Schlegels are nevertheless somewhat similar may be gathered from Haggblade 1983: 14–15.) However, unless fresh evidence is provided, it remains safe to say that the beginning of a 'scientific' attempt at language classification on the basis of morphological structure has its origins in the work of the brothers Schlegel, not the 18th-century 'forerunners.'

To the typologists of the early nineteenth century, especially Friedrich Schlegel and his brother August Wilhelm, but also to some extent to Wilhelm von Humboldt, who is usually credited with having launched this typological research program, the division of language types into so-called 'isolating,' 'agglutinating,' and 'inflecting' was linked to different stages of the development of the languages and language families in question. The high degree of fusion of morphological information into single markers, noticed especially in the classical Indo-European languages, Greek, Latin, and Sanskrit, was taken as a sign of linguistic sophistication that was reason enough to accord the so-called 'flectional' or inflective languages the highest point on the evolutionary ladder. Chinese with its basically monosyllabic structure, in which each lexical or grammatical function is expressed by a separate morpheme, ended up at the bottom of the scheme, although its antiquity (and the highly advanced culture of their speakers) could not have escaped these early typologists. (Steinthal, in 1860, tried to escape this dilemma by ranking Chinese among the 'form languages,' alongside with Indo-European and Semitic, as a special case.) Thus in terms of evolutionary probability there was an obvious built-in contradiction in these early taxonomies, which later typologists tried to resolve, though with limited success only. August Wilhelm Schlegel's influ-

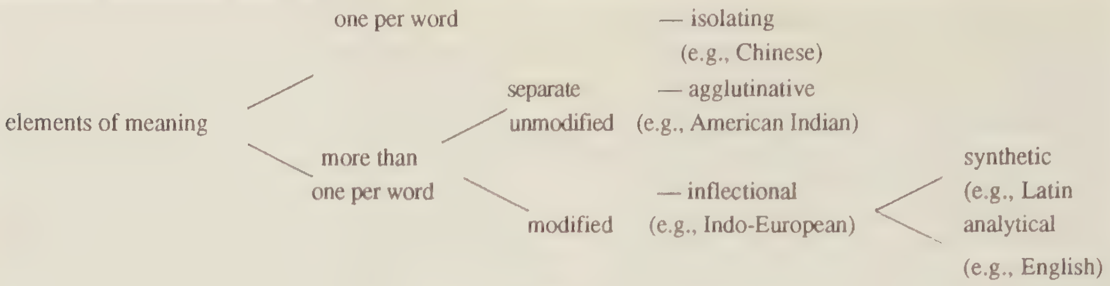


Figure 1.

ential tripartite classification of morphological types of 1818 may be diagrammed as shown in Fig. 1:

Inside the 'inflectional' (Indo-European) languages a further subdivision is made into 'synthetic' (e.g., the classical languages such as Greek and Sanskrit) and 'analytic' (the majority of the modern European languages).

In his *Comparative Grammar* of 1833 (pp.112–13) Franz Bopp, who had been critical of F. Schlegel's earlier scheme, subscribed to a large extent to A. W. Schlegel's framework. Wilhelm von Humboldt (1767–1835), too, subscribed to A. W. Schlegel's scheme, though with the added claim that the structure of a particular language reflects the particular 'genius' of a people and their *Weltanschauung*. This connection between language typology and specific manners of perception on the part of the speakers was to lead to a line of research in the nineteenth century, first synthesized by Heymann Steinthal (1823–99) during 1850–90, and followed, with modifications, by Franz Nikolaus Finck (1867–1910) and others in the late nineteenth, and by Edward Sapir and others in the early twentieth century, including among other things, the so-called Sapir–Whorf Hypothesis (see Koerner 1992), which claims a connection to exist between the perception of the outside world by a given people ('world-view') and the grammatical organization of their particular language.

Essentially two major lines of tradition in nineteenth-century typology can be distinguished: the one initiated by the Schlegels, almost exclusively based on morphology, which aims at the establishment of genetic relationships; the other, associated with the name of Wilhelm von Humboldt (and continued by H. Steinthal, G. von der Gabelentz, and others), which emphasizes linguistic diversity and classifies languages according to morphological–syntactic type (Telegdi 1970; cf. Morpurgo Davies 1975: 659–63, for a historiographical treatment). But these two strands have subsequently been combined in various ways by nineteenth- and twentieth-century successors, to the extent that individual ingredients have become hard to ascribe to one or the other.

It seems that August Schleicher in his *Die Sprachen Europas* of 1850 made the last attempt to combine the genetic, comparative, and typological strains, in which the '*flectirende Sprachklasse*,' largely the Indo-European language family (though Semitic is briefly mentioned as belonging to the same class) receives, as before, pride of place. Needless to say, his remarks were not always free of value-judgments. English, for example, with its loss of grammatical morphology and its widespread monosyllabic structure comes in for severe criticism; the language is characterized as having become debased ('*herabgesunken*,' p.231). Schleicher subsequently was concerned with genetic and comparative strains of linguistics, to the extent of fusing them into one method of research. However, his attempts at a rigorous treatment of morphological classification, first advanced in an 1859 essay, in which he introduced the term '*Morphologie*' into linguistic nomenclature, has been completely ignored in the annals of linguistic science (cf. Morpurgo Davies 1975: 664–65, despite her affirmation to the contrary). It appears that Steinthal's attack on Schleicher's 'mathematization of linguistics' effectively killed the project, and Schleicher soon abandoned it, concentrating instead on a synthesis of comparative–historical Indo-European linguistics in his 2-volume *Compendium* (1861–62; 4th edn., 1876), in which he was the first to lay down and to practice the method of reconstruction of protoforms. It appears that only William Dwight Whitney (1827–94), in his first textbook, was appreciative of Schleicher's 'very noteworthy attempt to give greater fulness and precision to the morphological classification [. . .] of language, by a more thorough analysis and a kind of algebraic notation, of morphological characteristics' (Whitney 1867: 364). Schleicher used capital letters, A B C, etc. for pure roots, i.e., words without variation or the addition of a formative element. Thus a sentence in Chinese may take the form A B C, etc. A Modern English sentence such as *Fish like water* may be described in the same manner, though this, as Whitney judiciously remarks (364–65, note), is not quite correct, given the case that the absence of an *-s* marks *water* as singular, and *fish* and *like* as plural 'by the absence of *s* from *like*.' Next, combinations of radicals with a formative element are marked by the addition of a small letter, either before or after the capital, e.g., *untrue* would be aA, but *truly* Aa. If the morphology becomes more involved, such as in *untruly* and *untruthfully*, the formulas would take on the sequences aAb and aAbcd, respectively. These patterns are illustrative of 'agglutinative' language forms. Letters from the Greek alphabet could be added to depict further sophistication, for instance in order to distinguish inflectional from derivative endings. For instance Turkish *babalarımızdan* (from *baba* 'father') meaning 'from our fathers' may be represented as $A\alpha\beta\gamma$, whereas, *seviştirilmemek* 'not to be made to love each other' would be $Aabcd\alpha$. Inflective changes affecting the root itself can be denoted by superscripts. For instance, if *man* is A, *men* would be A^a; *men's*, $A^a a$; *sang*, *sung*, *song* (from *sing*) would be represented as A^a, A^b, A^c, respectively. Compounds too could be illustrated in accordance with their morphological structure: *house-top* would be AB; *songwriter*, $A^a Ba$. (Schleicher published further modifications in 1861, but the above may serve as an illustration of his proposals.) Soon after Schleicher's death in 1868 Whitney as well as others changed their originally positive attitude to his work, and so this fairly ingenious technique of depicting complex morphological structure fell into oblivion.

The Humboldtian type of typological investigation, however, much less precise and rather speculative in nature, continued well into the twentieth century. The 'psychological' line of Humboldt–Steinthal–Finck, largely preoccupied with investigating the relationship between apperception and grammatical organization, was continued in the twentieth century in the work of Ernst Lewy (1881–1966), collected in Lewy (1961). In other quarters, for instance at the hands of the Viennese ethnologist Friedrich Müller (1834–98), languages were classified in accordance to physical traits of their speakers (e.g., the type of their hair), to the extent that race and language were no longer kept apart as independent aspects of humanity (Müller 1876–88). Value judgments among nineteenth-century typologists were not infrequent; even a scholar of the rank of Steinthal would nowadays be called 'a racist.' The same could much less be said of the work of another Humboldtian scholar, the sinologist Georg von der Gabelentz (1840–93), which has become recognized as particularly promising and much ahead of its time (Plank 1991). Gabelentz, under the influence of that order formidable Humboldtian scholar (next to Steinthal), August Friedrich Pott (1802–87), proposed a program of a new kind of 'general grammar' which was to use statistics as a control of typological regularities within and across individual languages.

As regards typological efforts in the early twentieth century of the 'classical' kind, Edward Sapir's (1884–1939) stands out as an example of a fine tuning of the post-Humboldtian heritage. Chapter Six ('Types of Linguistic Structure') in his 1921 book *Language* may be regarded as the culmination of this traditional endeavor. Sapir not only distinguished between simple and complex 'pure-relational' and 'mixed-relational' classes of languages, but also revived—and modified—the traditional tripartite division by distinguishing between 'agglutinative-isolating,' 'fusional isolating,' and 'symbolic-isolating' to add to the refinement of the first distinction. 'Further,' he says, 'should it prove desirable to insist on the degree of elaboration of the word, the terms "analytic," "synthetic," and "polysynthetic" can be added as descriptive terms' (p.148). (By using 'polysynthetic,' Sapir revives a term introduced by Peter Stephen Du Ponceau (1766–1844) in 1819 with regard to American Indian languages, also found in Whitney (1867: 365).) On pages 150–51 Sapir presents his classification of the different—and varying—types of morphological organization found in languages from many parts of the world, from Tibet, Africa, Europe, the Near East, Polynesia, and North America. But his contemporaries and followers were skeptical of the usefulness of such schemes and Sapir had no immediate follower. It required the work of Joseph H. Greenberg (b.1915) to change the perspective and introduce a new way of looking at typology that led to a fruitful program of linguistic investigation.

3. Implicational Typology and Language Universals

The various nineteenth-century strands of typological classification (described above) become unfashionable in the twentieth century for a variety of reasons. Many of them were obviously biased in favor of Indo-European; others were based on criteria that could no longer satisfy modern scientific requirements, and again others were merely descriptive or, worse, thoroughly positivistic in outlook. Mere taxonomy, even complex pigeonholing, treating different properties without investigating their relationships in any systematic way, had become uninteresting by the mid-century; explanation of linguistic phenomena and the discovery of general traits that may be characteristic of many languages, even unrelated ones, was becoming the order of the day. Rather than ascribing this change to the 'Chomskyan Revolution,' it appears much more plausible to assume that a general change of the intellectual climate was occurring around 1960, a change in the *Zeitgeist* which profited Chomsky as much as other scholars at the time. The scholar who is generally credited with giving linguistic typology a new direction was Roman Jakobson (1896–1982), whose 1957 paper at the 8th International Congress of Linguists is cited as seminal, both for what has since been called 'implicational typology' and the recognition of the importance of typology for historical linguistics (as Friedrich Schlegel had recognized 150 years earlier). The main proposals of Jakobson (1958) were that typological analysis of languages could be used to make statements of implication such as the presence of a certain category or phenomenon, e.g., a dual form, would entail the presence of a plural form in the same language, but that the reverse is not necessarily true. Such implications were claimed to have general, if not universal, validity, with the result that these empirical observations could be used to restrict the possibilities of linguistic reconstruction. In this way typology becomes an important tool of historical linguistics.

Jakobson's proposals were developed in a systematic way by Joseph Greenberg. On the basis of the (indeed well-known) relationship between morphological structure and syntactic organization in all known languages, for instance that languages with little morphology (like Chinese or English) have a rather strict word order to compensate for this, Greenberg (1963) set up a series of ‘implicational universals’ of the type ‘If a language has characteristic X, it will have (or is overwhelmingly likely to have) characteristic Y.’ In morphology, this may be expressed as in Universal 39: ‘Where morphemes of both number and case are present and both follow or both precede the noun base, the expression of number almost always comes between the noun base and the expression of case.’ In syntax, Greenberg advanced ‘universals’ like No. 3: ‘Languages with dominant V[erb] S[ubject] O[bject] order are always prepositional.’ These universals are, as is obvious from many of the formulations, empirically based, and the results of Greenberg's Stanford University project has been published in four volumes, devoted to general methodological issues, phonology, morphology, and syntax, respectively (Greenberg et al. 1978). Similar ongoing projects are located in Moscow under the banner of ‘structural typology’ (see papers by G. A. Klimov, V. N. Jarceva, V. A. Vinogradov and others in Lehmann 1990 and Lehmann & Jakusz Hewitt 1991), and in Cologne under the siglum UNITYP launched by Hansjakob Seiler during the 1970s (Seiler 1974, 1982) and is now directed by Hans-Jürgen Sasse. A long-standing research tradition has been active in Prague, with Vladimír Skalička (1909–91) and Petr Sgall (b.1926) as the leaders (see Skalička 1979; Sgall 1971, 1986). From most of the publications in the late twentieth century, it has become obvious that traditional typological studies have given way to an ongoing search for linguistic universals, both from a structural–functional and a comparative–historical perspective (Comrie 1983; Croft 1990).

Bibliography

Adelung J C 1806–17 *Mithridates oder allgemeine Sprachenkunde mit dem Vater Unser als Sprachprobee in bey nahe fünfhundert Sprachen und Mundarten*, 4 vols. in 6. Voss, Berlin (Continued by Vater J S)

Bonfante G 1953 Ideas on the kinship of the European languages from 1200 to 1800. *Cahiers d'histoire mondiale* **1**: 679–99

Comrie B 1983 *Language Universals and Linguistic Typology: Syntax and Morphology*. Basil Blackwell, Oxford

Coseriu E 1983 Adam Smith and the beginnings of language typology. *Historiographia Linguistica* **10**: 1–12

Croft W 1990 *Typology and Universals*. Cambridge University Press, Cambridge

Gabelentz G von der 1891 *Die Sprachwissenschaft: ihre Aufgaben, Methoden und bisherigen Ergebnisse*. T. O. Weigel, Leipzig

Gabelentz G von der 1894 Die Hypology [misspelt for ‘Typologie’] der Sprachen, eine neue Aufgabe der Linguistik. *Indogermanische Forschungen* **4**: 1–7

Greenberg J H 1963 Some universals of grammar with particular reference to the order of meaningful elements. In: Greenberg J H (ed.) *Universals of Language*. MIT Press, Cambridge, Massachusetts

Greenberg J H 1974 *Language Typology: A Historical and Analytical Overview*. Mouton, The Hague

Greenberg J H, Ferguson C A, Moravcsik E A (eds.) 1978 *Universals of Human Language*, 4 vols. Stanford University Press, Stanford, California

Haggblade E 1983 Contributors to the beginnings of language typology. *Historiographia Linguistica* **10**: 13–24

Jakobson R 1958 Typological studies and their contribution to historical comparative linguistics. In: Sivertsen E, et al. (eds.) *Proceedings of the Eighth International Congress of Linguists*. Oslo University Press, Oslo

Kaltz B 1980 *Les vrais principes de la langue françoise* de l'abbé Girard devant la critique du XVIIIe siècle à nos jours. In: Koerner E F K (ed.) *Progress in Linguistic Historiography: Papers from the International Conference on the History of the Language Sciences* (*Ottawa, 28–31 August 1978*). Benjamins, Amsterdam

Koerner E F K 1989 *Practising Linguistic Historiography: Selected Essays*. Benjamins, Amsterdam

Koerner E F K 1992 The Sapir-Whorf hypothesis: A preliminary history and a bibliographical essay. *Journal of Linguistic Anthropology* **2**: 173–198

Koerner E F K 1995 Toward a history of linguistic typology. In: Fisiak J (ed.) *Linguistic Reconstruction and Typology*. Mouton de Gruyter, Berlin

Lehmann W P (ed.) 1990 *Language Typology 1987: Systematic balance in language*. Benjamins, Amsterdam

Lehmann W P 1991 Franz Bopp's use of typology. *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* **44(3)**: 275–84

Lehmann W P, Jakusz Hewitt H-J (eds.) 1991 *Language Typology 1988: Typological Models in Reconstruction*. Benjamins, Amsterdam

Lewy E 1961 *Kleine Schriften*. Akademie-Verlag, Berlin

Metcalf G J 1974 The Indo-European hypothesis in the sixteenth and seventeenth centuries. In: Hymes D (ed.) *Studies in the History of Linguistics*. Indiana University Press, Bloomington, Indiana

Morpurgo Davies A 1975 Language classification in the nineteenth century. In: Sebeok T A (ed.) *Current Trends in Linguistics. Vol. XIII: Historiography of Linguistics*. Mouton, The Hague

Müller F 1876–88 *Grundriss der Sprachwissenschaft*, 4 parts in vols. A Höfler, Vienna

Noordegraaf J 1977 A few remarks on Adam Smith's dissertation (1761). *Historiographia Linguistica* **4**: 59–67

Picardi E 1977 Some problems of classification in linguistics and biology. *Historiographia Linguistica* **4**: 31–57

Plank F 1987 The Smith-Schlegel connection in linguistic typology: Forgotten fact or fiction? *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* **40**: 196–214

Plank F 1991 Hypologie, Typologie: The Gabelentz Puzzle. *Folia Linguistica* **25(3–4)**: 421–58

Schlegel A W 1818 *Observations sur la langue et la littérature provençales.* Librairie grecque-latine-allemande, Paris

Schlegel F 1808 *Ueber die Sprache und Weisheit der Indier: Ein Beitrag zur Begründung der Altertumskunde.* Mohr & Zimmer, Heidelberg (New edn. 1977 Benjamins, Amsterdam)

Schleicher A 1850 *Die Sprachen Europas in systematischer Uebersicht.* H. B. König, Bonn (New edn. 1983 Benjamins, Amsterdam)

Schleicher A 1859 *Zur Morphologie der Sprache.* Eggers, St. Petersburg

Schleicher A 1861 Zur Morphologie der Sprachen. *Beiträge zur vergleichenden Sprachforschung* **2**: 460–63

Seiler H 1974 Universals of Language. In: Heilmann L (ed.) *Proceedings of the Eleventh International Congress of Linguists*, vol. I. Il Mulino, Bologna

Seiler H 1982 [1979] Language universals research, language typology and individual grammar. *Acta Linguistica Academiae Scientarum Hungaricae* **29**: 353–67

Sgall P 1971 On the notion 'type of language.' *Travaux linguistiques de Prague* **4**: 75–87

Sgall P 1986 Classical typology and modern linguistics. *Folia Linguistica* **20**: 15–28

Skalička V 1979 *Typologische Studien.* F. Vieweg, Braunschweig

Smith A 1761 Considerations concerning the first formation of languages, and the different genius of original and compounded languages. *The Philological Miscellany* **1**: 440–79

Steinthal H 1850 *Die Classification der Sprachen, dargestellt als die Entwicklung der Sprachidee.* Ferdinand Dümmler, Berlin

Steinthal H 1860 *Charakteristik der hauptsächlichen Typen des Sprachbaues.* Ferdinand Dümmler, Berlin

Telegdi Zs 1970 Humboldt als Begründer der Sprachtypologie. In: Deszö L, Hajdú P (eds.) *Theoretical Problems of Typology and the Northern Eurasian Languages.* Akadémiai Kiadó, Budapest

Whitney W D 1867 *Language and the Study of Language: Twelve lectures on the principles of linguistic science.* Charles Scribner, New York

SECTION X

20th Century Linguistics

SECTION X
20th Century Linguistics

Trends in Twentieth-Century Linguistics: An Overview

John E. Joseph

1. 'Progress' and 'Science' in Linguistics

In order to evaluate and understand the twentieth century with any sort of objectivity, we need to extend our perspective backward in time. Historical continuities with the nineteenth and earlier centuries give a firmer grounding to judgments concerning the twentieth century. For linguistics, such continuities are manifest: the founders of twentieth-century linguistic theory, trained in that of the late nineteenth, rejected few of its fundamental principles but sought instead to extend their domain. Looking back over the whole of the past 200 years, a still grander continuity emerges, one that sweeps over and above the paradigmatic and methodological breaks and splinters that occupy our attention most of the time. It is the gradual realignment of the study of language away from moral science, philosophy, aesthetics, rhetoric, and philology, and in the direction of the natural sciences—first botany, biology, chemistry, and comparative anatomy; then geology; and finally physics, by way of mathematics. With this has come a steady elimination of human *will* from the object of study, the necessary condition for any 'science' in the modern sense. Over these same two centuries science has become virtually synonymous with academic prestige, as measured by institutionalization (creation of departments and positions, launching of journals, organizing of conferences), financial support from governmental and other grant-giving agencies, and public recognition. Not surprisingly, then, for linguists progress came to be equated with scientificization.

When in the first part of the twentieth century the great achievements of the nineteenth-century forebears were stated, it was in terms of the new methodological rigor they introduced into the analysis of language, and of their success in abandoning formerly connected fields, such as philology and mythology—rather than, say, how many more languages and linguistic phenomena were described and accounted for than previously, or how far language teaching had advanced. In other words, progress was defined as the acquisition of autonomous status for linguistic science (see Sect. 3.6). As for the mid-twentieth-century rapprochement with mathematics and physics, it was carried out in full consciousness and with overt references; 'mathematical linguistics' (now usually called computational linguistics) would even emerge as a significant subdiscipline.

2. Linguistic 'Mainstreams'

These developments did not affect all work on language equally. Rather, the 'mainstream' was progressively redefined in the direction of autonomous inquiry. By mainstream is meant the group having the greatest institutional power and prestige, with no implication that other approaches were 'backwater' in any sense other than the hold they possessed on the major journals, support agencies, academic departments, and public attention. Areas the mainstream deserted continued to interest other linguists, sometimes even to inspire new disciplines like general semantics, philosophy of language, and critical theory, to name just three. But in effect, 'linguistics' has come to designate a more or less autonomous approach to language, and this brief overview will not depart significantly from the traditional mainstream focus.

Defining linguistics was in fact the main goal of the book generally credited with shaping the twentieth-century linguistic agenda: the *Cours de linguistique générale* of Ferdinand de Saussure (1857–1913). As discussed in Sect. 4, Saussure established the framework for the 'synchronic' (nonhistorical) study of the language system, or *langue*, conceived as the socially-shared system of signs deposited in the mind of each speaker. Nevertheless, during at least the first third of the twentieth century the study of language continued to be dominated by the historical inquiry which had earned such prestige in the nineteenth century. Only gradually did synchronic linguistics gain practitioners and institutional acceptance, until eventually historical linguistics was itself partially marginalized and fundamentally refashioned in the light of synchronic findings.

From the 1930s through the 1950s the mainstream of linguistics was defined by various American and European 'schools' (understood as groups of linguists sharing some basic common assumptions about problems and methodology, while often disagreeing on particular matters) which are today grouped together as 'structuralist' (see Sect. 5). All of them had some greater or lesser intellectual debt to Saussure's *Cours* and to the groundwork laid by historical-comparative study. From the 1960s to the present, the mainstream has been defined by the 'generativist' approaches which originated in the work of Noam Chomsky (b. 1928; see Sect. 8). But as the twentieth century comes to a close, the synthesis of the last 30 years appears to be dissolving. Linguistics has splintered into a panoply of well-entrenched approaches that are roughly equal in prestige, and the field as a whole is coming under the shadow of emerging megadisciplines like cognitivism and connectionism (see Sect. 12).

3. Language Theory before World War I

By 1900 the firm hold which historical grammar had held upon mainstream status in linguistic science was being challenged by several adjacent fields of study. Even within the historical sphere linguists did not agree which if any of the leads provided by various versions of psychology should be followed. This section surveys what part of the general linguistics territory each field claimed as its own.

3.1 Historical Linguistics

By 1890 the mainstream of the field was definitively occupied by the approach which had been established around 1876 by the *Junggrammatiker* (Neogrammarians) of the University of Leipzig, whose work followed up on that of August Schleicher (1821–1868). It excluded virtually all manifestations of language except historical phonology, morphology, and syntax (in descending order of attention), and was primarily concerned with the Indo-European family and particular subgroupings within it. Phonology and morphology covered that part of language that could be cataloged as positive facts; syntax, on the other hand, had to be stated in relational terms, and for most known languages it involved a considerable volitional factor. Schleicher had excluded syntax from linguistic 'science' on the grounds that it was subject to free will. Although syntax continued to be of marginal importance relative to phonology, some important work in this area was carried out, notably by Berthold Delbrück (1842–1922).

By focusing their inquiry in this way the neogrammarians succeeded brilliantly in meeting the criteria for progress of their time. It seemed to many that they had done virtually all that it was possible for a true science of language (defined according to the then dominant ideology of positivism) to do. This is the impression one takes away from the first major historiographical study of linguistics in the modern period, Holger Pedersen's (1867–1953) *Linguistic Science in the 19th Century* (1931). But this progress was gained at the price of ignoring 'general' linguistic theory and leaving most aspects of language to the inquiry of adjacent fields. In particular, psychology annexed most aspects of language production and comprehension early on, a move hastened by the enormous influence of Wilhelm von Humboldt's (1767–1835) posthumously published treatise on language structure and mental development (1836). Even at the height of the neogrammarian ascendance, dissenting voices could be heard within the historical domain—most notably that of Hugo Schuchardt (1842–1927), who launched a major attack against the Leipzig mainstream in 1885.

3.2 Psychology

'Classical' psychology of the mid-nineteenth century was the very antithesis of positivism, formulating theories of mind and thought in a mode that we would today classify as philosophical. Psychological linguists in the Humboldtian tradition like Heymann Steinthal (1823–99) saw their investigations of language as a means to the understanding of national culture and thought. In particular, their work on the typology of languages continued to explore the parallels between mental structures and morphosyntactic structures. This mode did not disappear even when, a generation later, 'experimental' psychologists incorporated enough positivist methodology into their practice to maintain its scientific status and prestige. One of the most prominent figures of this period, Wilhelm Wundt (1832–1920), developed a *Völkerpsychologie* (psychology of nations) with a specifically linguistic component, and it gained enormous prestige, informing for example the first book by the great American linguist Leonard Bloomfield (see Sect. 5.2). But other linguists continued to object to the fact that the psychological approach worked backward from a priori notions about the nature and structure of the mind to form theories of language that could never be empirical or objective in anything but a superficial sense.

3.3 Phonetics and Dialectology

Experimental phonetics, the detailed measurement of speech sounds, offered the first truly positivistic approach to language, and had steadily grown in prestige through the influence of such individuals as Alexander Melville Bell (1819–1905) and Henry Sweet (1845–1912). Objective and quantitative as it was, no one could dispute its claims to scientificness. But while its descriptive power was unparalleled, and its pedagogical usefulness high, its explanatory power proved disappointing, especially to those who believed phonetic principles would provide the explanations for historical change. Phonetics could only deal with individual speech acts, not the abstract linguistic systems that underlay them, and its data tended to form an end in themselves. Whereas 'classical' psychology had suffered from being too cerebral and not empirical enough, phonetics was so single-mindedly empirical as to defy rational interpretation.

Still, in the age of positivism phonetics opened the possibility of accumulating masses of previously untapped data about living dialects. Detailed research on German dialects by Georg Wenker (1852–1911) in the 1870s began a trend that would reach maturity with the 10-volume *Atlas linguistique de la France* (1902–10) by the Swiss linguist Jules Gilliéron (1854–1926) and his assistant Edmond Edmont (1849–1926). Led by Gilliéron, the linguistic geographers developed their own critique of neogrammarian theory: against the dictum of absolute sound laws modulated only by analogy, Gilliéron stressed the impact of factors like homophonic clashes and popular etymology. This led to the resuscitation of a doctrine originally attributed to Jacob Grimm (1785–1863), which became the rallying cry of the anti-neogrammarian resistance: 'every word has its own history.'

3.4 Anthropology

Late in the nineteenth century, as anthropology moved from a physical toward a cultural orientation, an impressive fieldwork methodology developed based on positivistic principles. Since language was taken to be an integral element of culture, and since linguists were concerned mostly with tracing the history of Indo-European tongues, anthropologists had little choice but to undertake the description of unknown languages on their own. Franz Boas (1859–1942), a German émigré to America, became the organizational leader of anthropological linguistics and began a tradition of 'scientific' description of living languages within their own cultural framework, free of preformed ideas, including those of the psychologists. This is not to say that Boas ever rejected psychological concepts from anything but the collection and analysis of language data; nor did he reject the historical approach, since much of his activity was aimed at establishing the historical affiliations of American Indian tribes through their linguistic relations. Some have even seen a trace of Humboldtian linguistic thinking in the emphasis Boas placed on diversity over and above communality. In any case, Boas's school was probably the closest thing to a meeting ground for the various approaches to language at the start of the century, and as we shall see, it would take a leading role in American structuralism with the work of Boas's student and associate Edward Sapir (see Sect. 5.2).

3.5 Sociology

The young science of sociology also embodied the spirit of positivism, with which it shared the same recognized founder, Auguste Comte (1798–1857), and as the new century opened it had begun to seize a considerable portion of the intellectual territory once claimed by classical psychology, which by now appeared hopelessly old-fashioned and metaphysical. Emile Durkheim (1858–1917), who had gone to Germany for postgraduate study under Wundt but found his approach less than satisfactory, assumed the first chair in social science at Bordeaux in 1896 and obtained a professorship in Paris in 1902. Also in 1896 he founded the periodical *L'Année sociologique*, whose principal linguistic contributor would be Saussure's student and close associate Antoine Meillet (1866–1936). However, until the *Cours*, anything like a sociological formulation of linguistics would remain a vague desideratum. Wundt's national psychology still claimed this aspect of language for its own.

3.6 Toward an Autonomous General Linguistics

The roughly coeval rise to prominence of Boas's anthropology in the United States, Gilliéron's dialect geography and Durkheim's sociology in France, Sweet's articulatory phonetics in the United Kingdom, and Wundt's national psychology in Germany conspired to give a new impetus to the study of living languages that mainstream linguistics had long since abandoned. Not that all historical linguists had ever been content with the division of labor outlined above: some thought that historical-comparative linguistics alone could be scientific, others felt that other aspects could be studied scientifically but that this should fall to adjacent disciplines, and still others thought that historical–comparative linguistics should be expanded to take the other areas under its wing.

The last group faced the double disadvantage of having to emphasize the failures of nineteenth-century linguistic science and of offering potential students and the general public few clues as to how to reach the goals they set for themselves. Linguists with a basically historical orientation who published notable books on general linguistics in the late nineteenth and early twentieth century include William Dwight Whitney (1827–94), Michel Bréal (1832–1915), Abel Hovelacque (1843–96), Archibald Henry Sayce (1845–1933), Victor Henry (1850–1907), and Hanns Oertel (1868–1952). The works of Georg von der Gabelentz (1840–93) and especially Hermann Paul (1846–1921) deserve particular mention because although cast in the historical mold they anticipate the vision of the linguistic system that would characterize the structuralist period. But it was Whitney, first and foremost, who showed the way toward a modern general linguistics that would not be a smorgasbord where psychology, phonetics, and other subspecialties were served in equal portions, but a comprehensive study of language guided by historical principles and examining language for its own sake—a truly 'autonomous' approach.

One other prominent contributor to general linguistics needs to be discussed here: Otto Jespersen (1860–1943). Jespersen, who gained his early renown in phonetics and the history of English, undertook in the 1920s an attempt to delineate the 'logic' of grammar divorced from psychological underpinnings—work that among other things anticipates future directions in its attention to syntax and child language acquisition. Yet Jespersen would expressly reject some of the key tenets of Saussure's *Cours* and structuralism, making him the last great general linguist in the prestructuralist vein.

4. Saussure and the *Cours*

The decisive step in redirecting the linguistic mainstream to the study of living languages was taken by Ferdinand de Saussure (1857–1913) in three courses on general linguistics he gave at the University of Geneva between 1907 and 1911, a synthesis of which was published posthumously as the *Cours de linguistique générale* (Course in General Linguistics) in 1916 (see the article on *Saussurean Tradition in Linguistics*). Inspired in part by Whitney's views on the special fitness of linguists to direct the study of languages, living or dead, Saussure problematized these issues in a clearer and more methodical fashion than anyone before him. He maintained that language as an abstract system (*langue*) was the proper object of study of linguistics, and that 'synchronic' study of language as a static system should be kept rigorously distinct from 'diachronic' (i.e., historical, *langue*-focused) study.

Saussure delineated for the first time a program that would be neither historical nor ahistorical, neither psychological nor apsychological; yet more systematic than Whitneyan or Paulean general linguistics, so as to compare favorably in intellectual and methodological rigor with the rival approaches outlined in Sect. 3. Saussure tended increasingly toward sociological rather than psychological formulations of *langue* over the years in which he lectured on general linguistics. Again, this may be tied in part to the need to establish synchronic linguistics independently of either the dominant psychological establishment (Wundt) or the neogrammarians, who had combined with the psychologists to greater or lesser degrees. As suggested in Sect. 3.5, the young science of sociology offered one of the most progressive approaches to human phenomena, and was not yet so well-instituted as to pose any threat to the emergence of an autonomous general linguistics.

But most importantly, Saussure's program surpassed all rival approaches in crucial aspects of scientificization. The marginalization of actual speech production (*parole*) provided a quantum leap toward the elimination of volitional factors; the abstract language system, *langue*, is beyond the direct reach of the individual will. Secondly, Saussure's characterization of *langue* as a system of 'arbitrary' relations between spoken 'signifiers' (i.e., sound patterns) and mental 'signifieds' (i.e., concepts)—relations that are of pure form, where elements may in effect have any substance so long as they differ from one another—moved linguistics away from its nineteenth-century connections with biology (a science largely *passé* in academic glamour) and in the direction of mechanical physics, the mathematically-directed study of the physical universe, which was reascending to the forefront of scientific prestige after years of relative neglect.

Like its predecessors, Saussure's program brought progress as much through what it excluded as what it added. Although he spoke of a linguistics of *parole* that would cover the phonetic side of language and the products of individual will, he made it clear that investigating *langue* is the essential, real linguistics. Similarly, his program for diachronic linguistics was meant to reform, not marginalize, the historical study of language, yet such was the impact of his synchronic program that it dealt historical linguistics a blow from which it has never fully recovered. In both instances the *Cours* became the touchstone for developments that were probably inevitable, given the overall pressures for the rise of an autonomous science of living languages and the general evolution of academic prestige toward mathematical and physical approaches.

5. The Emergence of Structuralist Schools

The end of World War I (1914–18) brought a widespread sense of liberation from a century of German linguistic dominance. Linguists outside Germany, while still respectful of the neogrammarians' methods, now felt free to use, correct, or abandon them as they saw fit. In the first decade of the twentieth century the formulation of a national linguistics had meant the application of neogrammarian techniques to the study of German dialects, and even opposition views had to be defined relative to the Leipzig mainstream. But from the 1920s on a national linguistics came to mean a more or less original theoretical position held by a nation's leading linguists. Clearly, the postwar generation was ready for change.

In any survey of early structuralism the Geneva School deserves pride of place, for the role of Charles Bally (1865–1947) and Albert Sechehaye (1870–1946) in publishing the *Cours* and of Serge Karcevskij (see Sect. 5.3) in transmitting Saussure's doctrines to Moscow and Prague, as well as for the important original work done by these and other members (see *The Geneva School of Linguistics after Saussure*). Yet the Geneva School would be largely overshadowed by developments in other quarters, the most significant of which are surveyed in Sects. 5.2–4.

5.1 Features of Structuralism

The term 'structuralism' (which did not come into use in linguistics until the late 1920s) indicates a number of approaches to the study of language which arose at this time, having in common the following features:

(a) The study of 'systematic' phenomena more or less along the lines of Saussure's characterization of *langue*. (It has been noted that even Bally, in attempting to realize a linguistics of *parole* in his 'stylistics,' ended up by incorporating stylistic phenomena into the sphere of *langue*.)
(b) In conjunction with (a), an implied belief that 'abstract' levels of analysis are more fundamental, more deep-seated—in a word, more 'real'—than concrete ones.
(c) A preference for 'social' abstractions over mental ones, including an axiomatic faith in language as a fundamentally social phenomenon which nevertheless could best be studied through the utterances of individual speakers.
(d) In conjunction with (c), a general priority of linguistic 'form' over meaning—though see Sect. 5.4 on the 'London School.' (This is a continuing heritage from the neogrammarians, whose single-minded concentration on form had inspired Bréal to bring forth 'semantics' in reaction.)
(e) A deep distrust in written language, which is usually characterized as not being language at all but only a secondary representation—though see Sect. 5.3 on the Prague School. This feature seems however to be on a distinct level from the other four: contingent rather than necessary to the structuralist outlook, and certainly not restricted to it.

As will be clear from the following survey, structuralist linguistics arose across Europe and America not in a unified fashion, but in the form of national schools—not (contrary to a long-standing myth) through lack of contact, but because of a desire for intellectual independence (especially after the decades of German domination) and for theories that would reflect the different linguistic interests and ideologies of the various countries. Yet the postwar generation all sought approaches that appeared modern and scientific, and they landed on largely the same things. The *Cours* was a major influence on all the structuralist schools, though by no means the only one; it provided a theoretical program but little in the way of actual work to be carried out. All in all, the structuralist period is surprising both in its unity and its diversity.

5.2 American Structuralism

The two most prominent American linguists of the first half of the twentieth century, Edward Sapir (1884–1939) and Leonard Bloomfield (1887–1949) followed parallel and convergent career paths (see *American Structuralism*). Both were active, together with Boas and others, in the institutionalization of linguistics in America and in developing and refining the analytical method known as 'distributional' because of its classification of elements according to the environments in which they appear. Yet where Sapir's ideas are embedded in (though never subordinated to) a broad cultural–anthropological perspective, Bloomfield (formerly an adherent to Wundt's *Völkerpsychologie*) had become a behaviorist, and treated languages as systems of stimuli and responses. Meaning, being unavoidably mentalistic, was suspect to Bloomfield, unless it was determined objectively on the basis of distribution. (Some of Bloomfield's students and followers would develop a still more radical position, virtually exiling meaning from the purview of linguistics altogether, though it is a mistake to associate this position with Bloomfield himself.)

Despite their general convergence, then, Bloomfield's view was more narrowly linguistic than Sapir's and profited from its attachment to the empirical and 'modern' science of behaviorism. Such was the success of Bloomfield's 1933 book *Language* that it effectively set the agenda of American linguistics for a generation to come. Sapir and his students contributed at least as much as Bloomfield and the (neo-)Bloomfieldians to the refinement of the distributional method and phonemic theory, but never forsook their broader anthropological interests. Sapir's student Benjamin Lee Whorf (1897–1941) pursued a line of inquiry into the notion that the structure of thought might be dependent upon the structure of the linguistic system. This idea, later dubbed the 'Sapir–Whorf hypothesis', has roots dating back at least as far as John Locke (1632–1704). In a sense it is the ultimate expression of faith in the power of the linguistic system; but in any case it was anathema to the anti-mentalist Bloomfieldians, and even today it continues to arouse controversy.

5.3 The Prague School

Despite important contributions by its founder Vilém Mathesius (1882–1945) and other Czech members, the Prague Linguistic Circle (founded 1926) is best remembered for the work of three prominent Russians, Roman Jakobson (1896–1982), Serge Karcevskij (1884–1955), and N. S. Trubetzkoy (1890–1938) (see also *Prague School Phonology*). Jakobson had been a prominent member of the Moscow Linguistic Circle, a center of the Russian formalist movement, in which certain of the features listed in Sect. 5.1—most notably the priority of form over meaning—had arisen independently from Saussure (an indication that they were inherent in the Zeitgeist). Karcevskij had been at Geneva from 1906 to 1917, years that span Saussure's courses in general linguistics, and when he returned to Moscow after the October Revolution in 1917 he brought back a first-hand familiarity with Saussurean thought. Jakobson and Trubetzkoy recognized the points of convergence with formalism and earlier work by Russian linguists, but also appreciated the originality of Saussure's systematization.

The 'Theses Presented to the First Congress of Slavic Philologists in Prague, 1929' already evince the distinctive characteristics of Prague structuralism, namely breadth—they include programs for the study of poetic language and applications to language teaching—and 'functionalism.' The document begins: 'Language like any other human activity is goal-oriented' (Steiner 1982: 5). Besides any immediate material goal to be accomplished, Prague inquiry assumed a constant, implicit goal of maximally efficient communication, whether in the case of a casual utterance or some manifestation of poeticity. The Prague School also devoted considerable attention to analyzing the special nature of 'standard languages,' a topic in which they had a very practical interest given the need to establish and maintain a national language acceptable to both Czechs and Slovaks that had existed since the creation of Czechoslovakia in 1918.

In the 1930s Jakobson and Trubetzkoy took structuralism in the radically new direction of what is now called 'markedness' theory, which holds that certain elements in the linguistic system have an interrelationship that is neither arbitrary nor purely formal, but defined by the fact that one element is distinguished from the other through the addition of an extra feature, a 'mark.' When the distinction is neutralized it is always the simple, 'unmarked' member of the opposition that appears. This concept, which undoes the strict separation of substance and form, first arose in Trubetzkoy's phonology studies; Jakobson then extended it to morphology and other structural levels, ultimately developing it into a theory of linguistic 'naturalness' in which unmarked elements are predicted to be those which occur most widely across languages, are acquired first in childhood, and are lost last in aphasia.

Following his emigration to America in 1942, Jakobson exercised a fundamental impact on the development of structuralism, both through his conceptual innovations and his success in exporting his brand of structuralism to (a) other human and natural sciences, where it became the dominant paradigm in the 1950s and 1960s, and (b) American linguistics, through his influence (both direct and indirect) on Chomsky (see Sect. 8). Besides America, much of the later history of Prague structuralism was played out in Paris, in the work of André Martinet (b.1908), whose 'Functional Linguistics' continues to this day to develop key aspects of the Prague program (see *Functional Grammar*). But it is particularly with Jakobson and his followers, including Meillet's student Emile Benveniste (1902–76), that the structuralist concept of the system is elaborated to near-metaphysical proportions, while opening a vein of insights that linguists of many schools continue to mine.

5.4 Other Structuralist Currents

Two other traditions have been particularly influential, though neither so much as those of America or Prague. The first is the 'Copenhagen School' headed by Louis Hjelmslev (1899–1965), who went farther than any of his contemporaries toward working out the 'relational' nature of linguistic systems as implied in Saussure's *Cours* (see *The Glossematic School of Linguistics*). In principle the concern with form over substance was a common structuralist heritage, but as carried to its logical extreme by Hjelmslev it resulted in a higher degree of abstraction than Prague functionalism or American distributionalism could tolerate. Hjelmslev anticipated the 'algebraic' quality of post-World War II linguistics, and it is indeed in this later period that his primary influence is felt (see Sect. 7).

The other important structuralist tradition, the 'London School' founded by John Rupert Firth (1890–1960), deviates from the other schools in its treatment of feature (d), the priority of form over meaning, a fact which differentiates it most sharply from the Bloomfieldians (see *Firth and the London School of Linguistics*). In fact, Firth approached the whole systematic nature of language in an unparalleled way. Whereas other schools conceived of language systems as consisting of a small set of largely independent subsystems (phonology, morphology, syntax, suprasegmentals), for Firth language was 'polysystemic,' incorporating an infinite number of interdependent micro-systems which overlap the traditional levels of analysis. The London School's refusal to separate phonology and suprasegmentals, for example, made interaction with American structuralists almost impossible—yet it anticipated work in generative phonology by nearly half a century (see Sect. 8). The 'neo-Firthian' systemic linguistics of M. A. K. Halliday (b.1925; see *Systemic Theory*) and his followers represents, together with tagmemics (Sect. 7; see also *Tagmemics*), one of the most robust ongoing continuations of an essentially structuralist tradition.

Finally, special mention is due to Meillet's protégé Gustave Guillaume (1883–1960), a relatively isolated figure on the Parisian scene who cut his own structuralist path distinct from the dominant Pragueanism of Martinet and (in a different vein) Benveniste (see *Guillaumean Linguistics*). Like Hjelmslev, Guillaume was largely concerned with elaborating the systematic and abstract program of Saussure's *Cours*, but less algebraically and with more concern for linguistic data and psychological mechanisms. Guillaume's work was centered on French syntax, with a special predilection for analysis of the definite and indefinite article, which (in French at least) stands on the border between syntax and semantics. Here he was clearly ahead of his time, and it may be no surprise that he has gained his widest audience only during the 1970s and 1980s.

6. Developments in Historical Linguistics

Many linguists interpreted Saussure's arguments for synchronic study as implying that it alone was true linguistics—despite the fact that half of the *Cours* is devoted to diachronic matters. Jakobson took the lead in insisting that each of the two approaches actually implies the other. Certainly of the five features of structuralism in Sect. 5.1, none is blocked a priori from application to the diachronic dimension; and none of those linguists at the forefront of structuralism ever shied from tackling historical problems. Indeed, Jerzy Kuryłowicz's (1895–1978) 1927 demonstration that the distribution of the letter *H* in the recently identified and transcribed ancient language Hittite corresponded precisely to that of the abstract and hypothetical 'sonant coefficients' posited for Proto-Indo-European by Saussure in 1878, did much to convince historical linguists of the value of structural inquiry, and helped remind structuralists of the valuable corroboration historical data could provide to their theories.

Yet during the same period historical linguistics became the locus of a reaction against not just structuralism but the whole scientificization that had been underway for over a century. The point of departure for this reaction was Benedetto Croce's (1866–1952) call in 1900 for the return of language study to the realm of moral science and the human will. In view of the development of the field as outlined in Sect. 1, it is not surprising either that most mainstream linguists ignored Croce or that certain individuals (particularly in Italy) took up his call with great fervor. Karl Vossler's (1872–1949) attempt at a linguistic application of Croce's theories attracted a wide following, especially in German-speaking lands. The mainstream linguist most deeply affected was Matteo Bartoli (1873–1946), the founder of 'neolinguistics' (later called 'areal linguistics'), an approach to historical study combining Crocean ideas with the findings of dialect geography to create a counterpoint to neogrammarianism (see *Neolinguistic School in Italy*). After the deaths of Bartoli and Vossler the movement faded out, though not before the tenets of areal linguistics became well established in the historical and geographical approaches.

Another unique development arose in the former Soviet Union with the work of Nikolai Jakovlevich Marr (1865–1934), who argued for the existence of a grand historical macro-family of languages he called 'Noëtic,' whose principal branches would be Semitic and 'Japhetic.' The latter family, another of his inventions, included originally his native Georgian and the plausibly related Basque, but grew over the decades to subsume many extinct languages of the Mediterranean region (e.g., Iberian, Etruscan, Elamite) and was ultimately extended far into Asia, Africa, northern Europe (including eventually the Celtic and Germanic languages), and even America. Marr believed that this original Japhetic cultural unity—classless, communistic, and not tied to race—fell victim to 'Aryan' conquerors whose descendants would spawn European capitalism and imperialism. He insisted that suppressing this history was the goal of 'bourgeois linguistics,' i.e., the Western European historical–comparative tradition.

Marr's 'New Theory of Language' asserted that language was a superstructural element in Marxist terms (i.e., a direct consequence of the economic and social system), and strongly contested the Western European view of linguistic history as proceeding from unity to diversity, arguing that because of continuous language mixture we actually move in the opposite direction. Marr's 'paleontological analysis' reduced all the words of all languages to four basic elements—*sal*, *ber*, *yon*, and *rosh*, occurring singly or in combination—and analyzed their subsequent history according to his theory of 'stadialism,' which held that economic revolution must produce linguistic evolution.

Outside the USSR, Marr's theories were dismissed as methodologically unsound and ideologically driven; his fantastic etymologies and genealogies and his claims to penetrate the thoughts and mental development of prehistoric peoples were beyond the pale of scholarly objectivity. The strongest repudiation of his views came in 1950 when his own countrymen, led by Stalin himself, denied that language was superstructural, dismissed Japhetic theory and paleontological analysis, and embraced the historical-comparative method as scientifically sound.

The 1980s saw a revival of interest in linguistic 'mega-families' like Nostratic (embracing at least Indo-European, Semitic, Georgian and Basque) and the vast American Indian reconstructions of Joseph Greenberg (see Sect. 10). These proposals, while at first attracting enormous attention in the popular press, were met with skepticism from the ranks of historical linguists and have largely retreated into specialized corners.

7. Post-World War II 'Algebraic' Structuralism

From about 1945 younger linguists showed an increasing bent toward the algebraic and mathematical aspects of structuralism, in the use of tables, formulas, and other mathematical schemata, statistics, calculations, and the generally rigorous working out of the notions of system and systematicity. Such a bent had already figured prominently in the work of Hjelmslev and Guillaume (Sect. 5.4). In the early 1950s military and commercial interest in furthering the wartime progress on computers and machine translation improved the fortunes of many linguists, particularly in America, and gave even more impetus to the development of computationally-based models.

In America, the 'neo-Bloomfieldians' assumed the mainstream mantle they had previously shared with the disciples of Sapir (see *American Structuralism*), and 'anthropological linguistics' retreated to the status of a subdiscipline. Bloomfield's mathematically inclined heir apparent Charles F. Hockett (b.1916) rose to prominence, as did Zellig S. Harris (1909–92), whose *Methods of Structural Linguistics* (completed 1947, published 1951) marked the high point in the systematization of Bloomfieldian analysis. Harris, Hockett, and Jakobson also began extending their inquiry to syntax, a largely neglected area (despite a number of high-quality contributions over the years, especially in the historical domain). Although syntactic studies would not come fully into their own until the ascendence of Chomsky, who declared a sharp break with the structuralist (especially the neo-Bloomfieldian) tradition (Sect. 8), nevertheless in his wake further structuralist accounts of syntax were put forward, of which the most notable are the 'stratificational grammar' of Sydney M. Lamb (b.1929), which follows largely in the tradition of Hjelmslev (see *Stratificational Grammar; The Glossematic School of Linguistics*), and the 'tagmemics' of Kenneth L. Pike (b.1912; see *Tagmemics*).

Pike, who had taken courses with Sapir and Bloomfield, has had enormous influence not only for his definitive work on phonemic theory but also for his decades-long association with the Summer Institute of Linguistics and the Wycliffe Bible Translators, dedicated to translating the gospel into every one of the world's languages. Through their auspices hundreds if not thousands of descriptive linguists have been trained in tagmemic analysis, and as a result, our knowledge of the structure of many languages exists only in this form. The religious side of Pike's activity has caused it to be neglected in accounts of modern linguistics, but it is largely the reason why the structuralist tradition continues at present to have a significant existence throughout the world.

In Europe too syntactic studies were underway, following on the pioneering work of Lucien Tesnière (1893–1954; see *Valency Grammar*), but the focus of structuralist investigation continued to be phonology, and dialect geographic and historical linguistics continued to be more actively pursued than in the USA. Meanwhile the younger generation of European scholars looked increasingly to America for innovative ideas and technological advances. Hence the major development in structuralism during this period was its exportation to other fields—until a revolt against structuralism became part of the student uprisings of 1968. From the mid-1960s to the mid-1970s, European linguistics turned increasingly toward American generativism, while the other human sciences played out a 'poststructuralist' phase.

8. Transformational–Generative Grammar, including Generative Phonology

The mainstream of linguistics in the last four decades of the twentieth century has been shaped by the work of Avram Noam Chomsky (b.1928), who had ties to Bloomfield through his teacher Zellig Harris (see Sect. 7), and to Jakobson through personal acquaintance and through his close association with Jakobson's student Morris Halle (b.1923). It is widely believed that in its concern with 'universal' aspects of language Chomsky's program is a continuation of Jakobson's; in any case, it had no precedent in neo-Bloomfieldian structuralism. Such was Chomsky's success in overturning mainstream structuralist tenets that it is no exaggeration to say he revolutionized the field—though in broader perspective even this 'revolution' only helped advanced linguistics further along the path it had been following for over 150 years. Chomsky's avowed aim was to bring linguistics to the level of rigor of physics, at once the most mathematical and the most exact of the physical sciences. In his early years he worked directly on mathematical models of language, but finally abandoned this line of inquiry to devote himself to his 'context-free phrase structure' models of syntax and, through the 1960s, phonology (see *Evolution of Transformational Grammar*).

8.1 Chomsky's 'Standard Theory' (1955–65)

Much as the search for 'science' led nineteenth-century linguists to eliminate living languages and structuralists to eliminate *parole* from their sphere of inquiry, Chomsky too eliminated from consideration everything but the linguistic competence of an idealized native speaker-hearer. He utterly rejected the behaviorism that was part of Bloomfield's legacy, arguing that language is not a behavioral phenomenon but a mental attribute (later he would refer to it as an 'organ') that is 'universal' and 'innate.' (Actually, the version of linguistic behaviorism Chomsky most memorably attacked was not Bloomfield's, but that of B. F. Skinner (1904–90), a prominent Harvard 'behavioral psychologist' not directly affiliated with any linguistic school or tradition.)

The claim of innateness not just of general language faculties but of specific grammatical features is what most abruptly severs Chomsky's thought from its predecessors, for in certain other ways it represents a continuity and furthering of the structuralist approach. In terms of the features of structuralism listed in Sect. 5.1, only (c), the preference for social abstractions over mental ones (which implies behaviorism in a greater or lesser degree), is clearly abandoned by Chomsky. The other goals are maintained or intensified. Regarding methodology, Chomsky rejected distributionalism as naively empiricist, capable only of revealing the trivial phenomena of 'surface' structure rather than the 'deep' structure which constitutes a language's innate, universal core. Data garnered through introspection by the linguist—formerly suspect—were deemed superior to those acquired 'objectively' because of the new status granted to the mind. And the 'transformations' which lead from deep to surface structure became a hallmark not only of Chomsky's linguistics but of later structuralist thought generally.

Where his work was in conflict with the structuralist mainstream Chomsky sought alignment with still earlier traditions, in particular with 'Cartesian' linguistics which other historians of linguistics have not followed him in recognizing. More subtly, his representation of phrase structure as tree diagrams tied him to a didactic tradition that embodied much of what the structuralist enterprise had labored against. In the early 1960s, when the race for American superiority in space brought unprecedented funding especially to 'scientific' enterprises, Chomsky attracted talented disciples from various fields and was enormously successful in getting both publicity and government funding. Despite the reticence or outright refusal of most senior structuralists to accept its leading ideas, transformational-generative grammar became mainstream linguistics in America around the mid-1960s and was on its way to having this status worldwide, the first unified paradigm since neogrammarianism to do so.

8.2 *From Generative Semantics to the Revised Extended Standard Theory (1966–78)*

Within a short time, however, dissension erupted within the generative ranks, led by some of Chomsky's most talented followers (see *Generative Semantics*). The central issue was Chomsky's insistence upon the radical autonomy of syntax. In Chomsky's view, syntactic rules represent the initial stage of language generation; phonological and semantic rules are subsequent and 'interpretative.' This radical version of the structuralist priority of form over meaning conflicted with the common intuition that meaning perhaps need not, but can, determine syntax to a degree sufficient to render the 'autonomy' of syntax virtually nonexistent. The colleagues who broke with Chomsky at this time did so in the name of 'generative' (as opposed to interpretative) semantics, and though this was no organized movement with a coherent research framework, it has had a lasting impact on the field (see R. A. Harris 1993). Besides reviving interest in semantics as a major subdiscipline of linguistics (whence it was all but banished during the neo-Bloomfieldian ascendancy), it gave rise to the thriving area of discourse pragmatics (see Sect. 11), which studies how topic and focus phenomena determine word order even in supposedly 'syntactic' languages, and to George Lakoff's (b.1941) influential work on metaphor in language and thought. Many of the leading ideas of generative semantics were absorbed into later breakaway generative paradigms, and soon thereafter into Chomsky's own program (examples include predicate–raising, logical form, lexical decomposition, globality; see further Sect. 8.3).

Chomsky's response to this challenge included significant revisions to the theory, although he continued to assert more strongly than ever the autonomy of syntax and the interpretative nature of semantics. The principal changes made in this period were a shift of emphasis away from phrase structure rules and toward word-specific features specified in the lexicon, and severe restrictions placed on transformations, which were no longer permitted to add or delete but only to move elements already present in deep structure. This led to a complexification of structural levels and the introduction of 'empty categories,' 'traces,' and 'filters' to do the work transformations formerly did. Chomsky still insisted that grammatical roles like subject and object must be derived from word order, despite the success of Charles Fillmore's (b.1929) 'case grammar' in explaining these phenomena without the sometimes elaborate mechanisms to which Chomsky had to resort (see *Case Grammar*). The result was that by the mid-1970s the 'extended standard theory' had reached a state of such complexity that its claims to account for the speed and efficiency of child language acquisition were growing ever poorer, and alternative models were proliferating annually.

8.3 *Government and Binding Theory; Alternative Generative Theories*

Saussurean and Jakobsonian structuralism continued to be the dominant mode of linguistic analysis in Europe until the student revolts of 1968. Meanwhile, scores of new universities and linguistics positions were being created throughout Europe in the 1960s and 1970s. The combined result was that a large post-World War II generation of linguists starting their careers found that the tradition in which they had been trained was intellectually passé. Some turned to the fashionable post-structuralist approaches suggested by the work of Michel Foucault (1926–84), Jacques Derrida (b.1930), and others. But another group of young European linguists became Chomsky's new core constituency, and it was to them, in Pisa in 1979, that he presented his new, pared-down, 'neoclassical' version of generative linguistics, called 'Principles and Parameters' or government and binding theory (GB), the objective of which is to formulate the 'parameters' of 'core' universal grammar in the most general possible way. Part of the new simplicity was gained through finally admitting a system of grammatical relations as primary (though without acknowledging that this represented any sort of concession to rival theories), and in the final abandonment of phrase–structure rules, with ever greater emphasis on lexical specification. But in general, GB shifted the focus of linguistic inquiry away from accounting for specific problems in specific languages, and toward relating problems within and among languages. By tracing not obviously related problems to single sources, it seemed for several years to point toward a greater economy of explanation, and hence toward real progress in the understanding of human language structure.

By the late 1980s, however, new categories and principles had begun to proliferate in the light of more detailed data, and GB moved toward a strongly lexicalist model that rejects any notion of deep or (D-) structure. Since 1991 Chomsky himself has turned his attention away from the kinds of problems GB was aimed at solving, and toward a 'minimalist program' devoted to the investigation of features shared by all languages. At present no one approach can claim mainstream status, though it is probably accurate to say that this status is shared by the whole cluster of generative theories, including minimalism, GB, lexical-functional grammar, relational grammar, and numerous other approaches, including generalized phrase structure grammar (GPSG) and head-driven phrase structure grammar (HPSG), both of which restore phrase structure rules to the prominence they had in earlier transformational-generative grammar, while eliminating the transformational component completely. (For a fuller survey of these approaches, see Droste & Joseph 1991; see also *Applicational Grammar*; *Case Grammar*; *Cognitive Grammar*.)

8.4 Generative Phonology

Generative phonology has developed in parallel with (and sometimes in the shadow of) syntactic theory. Chomsky & Halle's *Sound Pattern of English* (1968) established the basis of a phonological theory that would recapitulate the syntactic model in so far as possible (an unacknowledged bond with London School structuralism and Praguean phonology). Because phonology, unlike syntax, consists of a fixed number of elements, a degree of systematic completeness was achieved that syntactic studies could never match. Early generative phonology incorporated Jakobson's distinctive feature theory, as well as an extremely formalized version of markedness theory (which subsequently found a prominent place in GB as well). A less formalized version of markedness soon gave rise to various versions of 'natural phonology' in which phonetic complexity interfaces with systemic considerations to determine marked and unmarked structures.

However, from the mid-1970s on, the mainstream of phonological work shifted to more formal analytical considerations, starting with the proper representation of 'suprasegmentals,' most notably stress and the tones of tone languages (another unacknowledged bond with the London School). John Goldsmith's (b.1951) model of 'autosegmental phonology' gave rise to numerous attempts at accounting for phonology through the use of 'tier' and 'template' models, and of 'underspecification' of phonological units as a way of accounting for the behavior of maximally unmarked elements.

Natural phonology led in due course to natural morphology and syntax, which in turn gave impetus to studies of 'iconicity' between sound and meaning (another topic anticipated by Jakobson); and underspecification theory has been extended to other levels of linguistic structure. Even if phonology no longer occupies the central position it did during the structuralist period, it continues to spawn much original work that exports as many ideas as it imports to other linguistic realms.

9. Sociolinguistics

We have seen that each movement toward greater autonomy in linguistics brings an opposite (if unequal) reaction toward re-placing language in a more broadly human context. Thus Humboldtian psychologism came on the heels of early historical–comparative linguistics, Neogrammarianism coincided with the academic institutionalization of modern literature studies, and structuralism arose contemporaneously with Crocean aestheticism. So too, generative semantics may be seen as a corrective reaction against the excesses of transformationalism, as in fact may the contemporary rise of a large number of alternative approaches to language, three of which are surveyed in the following sections. The most significant of these is sociolinguistics.

The origins of linguistic geography were treated in Sect. 3.3 above, which noted that its rise to prominence in the early part of the twentieth century created a momentum for synchronic linguistics. Although the arrival of structuralism kept linguistic geography from ever having mainstream status, it continued to be an active and vibrant research area in Europe and, starting in the 1930s, in America, under the leadership of Austrian-born Hans Kurath (1891–1992). The shallower time depth of English in America meant that geographic isoglosses were often less clearly defined and more susceptible to socially-based considerations. Raven McDavid (1911–84) took up these social factors starting in the mid-1940s, around the same time that a group of scholars centered at Columbia University, led by André Martinet (b.1908) and his student Uriel Weinreich (1926–67), began to emphasize the importance of class dialects. At least one prominent sociologist, Paul Hanly Furfey (1896–1992), was training students in linguistic research as well, and by the early 1950s a number of individuals were actively engaged in collecting language data along social-class lines. The movement did not attract wide attention however until the early 1960s and the early studies of William Labov (b.1927), which coincided with increased US government interest in funding social research and the study of black English at the height of the civil rights movement.

Labov's studies established themselves at once at the forefront of sociolinguistics, to the point that earlier work was largely forgotten. The reasons are by now familiar: increased 'scientificness,' in particular mathematicality, attained through a heavy reliance on statistical information and calculation. The use of 'variable rules' effectively brought into the domain of *langue* much that otherwise would have been relegated to *parole*, providing a further systematization and reclaiming of territory from voluntary language production. Moreover, Labov's demonstrations of how social variation can be the synchronic reflex of diachronic change has led to a significant merger between sociolinguistics and historical linguistics in the United States and the United Kingdom.

Sociolinguistics never achieved mainstream status in the United States, and while very much alive there, it has fared better still in the United Kingdom, a country that is generally more class-conscious and has a long tradition of dialect studies. The London School and 'systemic' linguistics have always emphasized the dual nature of language as social semiotic—and unlike most other structural approaches, they have done more than focus on one aspect while paying lip service to the other.

10. Universal–Typological Linguistics

Beginning in the late 1950s, Joseph H. Greenberg (b.1915), a linguist in the anthropological tradition, began rethinking long-neglected questions of language universals and typology, the latter in connection with his important work on classifying African languages. That his interest in universals arose simultaneously with Chomsky's in universal grammar is, despite their considerable differences, evidence of the power of Jakobsonian structuralism on younger American linguists of the period (Greenberg admits this influence more readily than Chomsky does).

While Chomsky claimed that study of any one language in its deep structure would by definition be a study of universals, Greenberg set about looking for universals in an empirical way, by examining the grammars of a sample of languages from numerous language families. He found that while absolute universals, such as having the vowel /a/, were trivial to the deeper understanding and functioning of language systems, a large number of 'implicational' universals could be discerned that related the functioning of seemingly disparate linguistic elements to one another in previously unsuspected ways. For example, he found that while languages are almost equally divided between those which place objects before and after verbs, and between those which place objects before and after adpositions (a cover term for prepositions and postpositions), the two features correlate such that postpositional languages tend overwhelmingly to have the order object–verb and prepositional languages to have verb–object. That is, objects tend to come either before or after both verbs and adpositions in a given language, suggesting that there exists a unified process of government that supersedes that of either of these categories.

Although Greenberg's work was directly in line with Chomsky's both in the overall program of a search for the universal and in the more specific result of collapsing traditional distinctions into mega-categories like government, Chomsky and other generative linguists have from the beginning refused to admit a meaningful connection between the two programs, arguing that Greenberg dealt with mere surface structure phenomena and drew meaningless conclusions from statistical tendencies. For the neo-Bloomfieldians—whose main concern had been to avoid creating pseudo-universals by imposing the categories and structures of their native language on the very different languages they were investigating—and for European structuralists generally, the empirical nature of Greenberg's work and that of others in the same vein, including Bernard Comrie (b.1947) and John Hawkins (b.1947), made it much more palatable than Chomsky's, which appeared to admit of no disproof. Significant strides toward reconciling the Greenbergian and Chomskyan visions of language universals have finally been made in the last 15 years.

11. Discourse Analysis

The final trend to be considered here is remarkable for tying together several disparate traditions in the goal of expanding language analysis beyond the level of the individual utterance. Traditionally this was the goal of rhetoric, and later of 'stylistics' as practiced for example by Saussure's associate Charles Bally. For linguistics proper, however, the amount of (seemingly willful) variation possible beyond the level of the clause seemed to establish this as a firm upper limit to the extent of *langue*.

This may be why the impulse to go further came from sociology, particularly from the 'conversational analysis' initiated by Harvey Sacks (1935–75) in the 1960s, within the more general paradigm of ethnomethodology founded by Harold Garfinkel (b.1929). This work did not find common ground with Labovian sociolinguistics, but did establish bonds with the 'ethnology of speaking' approach founded by Dell H. Hymes (b.1927), who had been trained in the anthropological tradition. What is more, both conversational analysis and the ethnography of communication found common ground with Halliday and the London School, as well as with Prague School analysis of sentence perspective (see also *Prague School Syntax and Semantics*). John J. Gumperz (b.1922) is generally credited with having drawn these various trends together in the later 1960s into the field known as 'discourse analysis' (see Murray 1994).

Discourse analysis soon received valuable input from an unlikely source: generative semantics. In making their case against the hegemony of syntax the generative semanticists gave particular attention to 'pragmatics,' the study of topic and focus phenomena (a Praguean heritage), and pragmatics was readily incorporated into the more general scope of discourse analysis, which henceforth could claim probably the richest heritage (sociological–anthropological–Genevan/American/Praguean/London – structuralist generativist) of any current trend (see also *Generative Semantics*). In the early 1990s Deborah Tannen's (b.1945) analyses of men's and women's conversational patterns achieved unprecedented popular success in America—and perhaps not coincidentally, discourse analysis appears to be emerging as a contender for mainstream status. It is drawing increasing interest from 'cognitive scientists' (see Sect. 12) as well as from adjacent humanistic fields, including literary criticism.

In this convergence of research traditions we have in a sense the final culmination of the scientificization of language study. Over the past 200 years the dividing line between the systematic and the willful has shifted progressively from phonology to morphology to part of syntax to all of syntax and now finally to all of discourse. The result of this seems to be, in other words, that no aspect of language need be considered unsystematic; no aspect cannot ultimately be accounted for in a scientific, even algebraic way. Through all the vagaries of neogrammarianism, structuralism, and generativism, behaviorism and universalism, rationalism and empiricism, this path of development has continued unbroken.

12. Conclusion

For language theory the twentieth century has been a time of great intellectual ferment, only part of which is reflected in a chronicle of mainstreams. Much of the remaining story is told in other, nonhistorical entries in the 1994 *Encyclopedia of Language & Linguistics*; much more is not told, because it falls outside the scope of linguistics as currently defined.

But the definition of the field is changing. 'Semiotics' has come into existence as the kind of general science of signs envisioned by figures like Saussure and Charles Sanders Peirce (1839–1914). Closer to the mainstream, the rise of 'cognitive science' as an umbrella category covering linguistics as well as much work in psychology, philosophy, computer science, artificial intelligence, and consciousness studies, has come about largely through the influence of Chomsky and his school. Cognitive scientists see the autonomous structure of language as providing the key to the structure of the mind; in general, they believe that creating the most efficient model of artificial intelligence is the best possible way of discovering how the mind operates. This notion has however come into conflict with another view of the mind and its operation, called 'connectionism,' which is skeptical about the claims of cognitive science and prefers to construct explanations through a combination of evidence acquired through direct study of neural networks and processes of perception and mental organization as well as of language structure. The challenge for linguistics as the twentieth century ends is to reassert the autonomous status of language and account for its interaction with other, equally autonomous mental faculties.

It has become a commonplace to associate the rise of formalism and structuralism in late nineteenth- and twentieth-century thought with the rise of Marxism in both the intellectual and the political spheres. If the connection is indeed real, then we should not be surprised if the demise of Marxism portends radical change in Western thought, including linguistics. We should not even be surprised if the 200-year course of scientificization described at the beginning of this article were, finally, reversed. A revival of interest in problematizing the 'autonomy' of linguistics, nascent at the time of this writing, may prove to be the first tentative step in this direction.

Bibliography

Anderson S R 1985 *Phonology in the 20th Century: Theories of Rules and Theories of Representation*. University of Chicago Press, Chicago, Illinois

Andresen J T 1990 *Linguistics in America 1769–1924*. Routledge, London

Botha R P 1992 *Twentieth Century Conceptions of Language*. Blackwell, Oxford

Darnell R 1990 *Edward Sapir: Linguist, Anthropologist, Humanist*. University of California Press, Berkeley, California

Droste F G, Joseph J E (eds.) 1991 *Linguistic Theory and Grammatical Description*. Benjamins, Amsterdam

Figueroa E 1994 *Sociolinguistic Metatheory*. Pergamon, Oxford

Harris R (ed.) 1988 *Linguistic Thought in England, 1914–45*. Duckworth, London

Harris R A 1993 *The Linguistics Wars*. Oxford University Press, New York

Hymes D, Fought J 1981 *American Structuralism*. Mouton, The Hague

Joseph J E, Taylor T J 1990 *Ideologies of Language*. Routledge, London

Koerner E F K 1973 *Ferdinand de Saussure: Origin and Development of his Linguistic Thought in Western Studies of Language*. Vieweg, Braunschweig

Matthews P H 1993 *Grammatical Theory in the United States: From Bloomfield to Chomsky*. Cambridge University Press, Cambridge

Murray S O 1994 *Theory Groups and the Study of Language in North America: A Social History*. Benjamins, Amsterdam

Newmeyer F J 1986 *Linguistic Theory in America*, 2nd edn. Academic Press, Orlando, Florida

Pedersen H 1931 *The Discovery of Language*. Harvard University Press, Cambridge, Massachusetts

Robins R H 1990 *A Short History of Linguistics*, 3rd edn. Longman, London

Sampson G 1980 *Schools of Linguistics: Competition and Evolution*. Hutchinson, London

Steiner P (ed.) 1982 *The Prague School: Selected Writings 1929–46*. University of Texas Press, Austin, Texas

Tagliavini C 1968 *Panorama di storia della linguistica*, 2nd edn. R Pàtron, Bologna

Vachek J 1966 *The Linguistic School of Prague: An Introduction to Its Theory and Practice*. Indiana University Press, Bloomington, Indiana

Saussurean Tradition in Linguistics

John E. Joseph

The Swiss linguist Ferdinand de Saussure (1857–1913) established his reputation at an early age, with his 1878 monograph *Mémoire sur le système primitif des voyelles dans les langues indo-européennes* ('the original vowel system of the Indo-European languages'). The *Mémoire* posited the existence of two Proto-Indo-European 'sonant coefficients' which appeared in no attested forms of the daughter languages, but could account for certain vowel developments which had previously appeared irregular. (Fifty years later an *H* with exactly the distribution of Saussure's sonant coefficients was discovered in Hittite, confirming his hypothesis.) After his 1881 doctoral thesis on the absolute genitive in Sanskrit, Saussure published no more books, only articles on specific topics in historical linguistics.

But in 1907, 1908–09, and 1910–11, he gave at the University of Geneva three courses in general linguistics, a topic on which he never published anything. Soon after his death in 1913, his colleagues Charles Bally (1865–1947) and Albert Sechehaye (1870–1946), appreciating the extraordinary nature of the courses Saussure had given, began gathering what manuscript notes they could find, together with the careful and detailed notebooks of students who had taken one or more of the three courses, especially Albert Riedlinger (1883–1978). From these they fashioned the *Cours de linguistique générale*, published at Lausanne and Paris in 1916. It would become one of the most influential books of the twentieth century, not just for linguistics, but for virtually every realm of intellectual endeavor.

In order to trace the Saussurean tradition in twentieth-century linguistics, this article considers nine key elements of Saussure's view of language. For each a summary is given of the condition prior to Saussure, of Saussure's own view, and of how his view has shaped linguistic inquiry in the years since the publication of the *Cours*.

1. The Establishment of Synchronic Linguistics

At the time of Saussure's lectures, the study of language had been dominated for over 30 years by (a) historical work on the language of written texts (work which had only gradually come to be distinguished from 'philology,' inquiry aimed not at the language but at better understanding of the text itself); (b) dialectological work based on field investigation of local dialects; (c) phonetics, which demanded increasingly minute observation in strong adherence to the positivistic spirit; and (d) psychology, the principal domain of a global perspective on language, dominated by the ideas of Wilhelm von Humboldt (1767–1835) and his followers, notably Heymann Steinthal (1823–99) and Wilhelm Wundt (1832–1920) (see *Trends in Twentieth-Century Linguistics: An Overview*).

A fifth approach existed—the study of language as a general phenomenon independent of historical or psychological considerations—but it had made little progress since the death of its principal exponent, the American scholar William Dwight Whitney (1827–94). Furthermore, the publication of a major study of language in 1900 by the Leipzig psychologist Wundt appeared to signal that the new century would give the 'general' study of language over fully to that discipline.

Saussure's problem was to delineate a study of language that would be neither historical nor ahistorical, neither psychological nor apsychological; yet more systematic than Whitneyan general linguistics, so as to be at least the equal in intellectual and methodological rigor to the historical, psychological, and phonetic approaches. His solution was to make a strong distinction between the study of language as a static system, which he called 'synchronic' linguistics, and the study of language change, which he called 'diachronic' linguistics (or, until 1908, 'evolutive'). Saussure's rejection of the traditional term 'historical' seems to have been based in part on a disdain for the reliance it suggested upon extralinguistic factors and written texts, and in part on a desire for terminological symmetry with 'synchronic.' Synchronic linguistics would henceforth designate the study of language systems in and of themselves, divorced from external considerations of a historical or psychological sort, or any factor having to do with actual speech production.

This is the single most sweeping of Saussurean traditions: for insofar as twentieth-century linguists have focused their efforts neither on simple description of languages, nor on their evolution, nor on their connection to 'national psychology,' they have realized Saussure's program of synchronic linguistics. Furthermore, historical linguistics has largely become the diachronic enterprise envisioned by Saussure (though the term 'historical' continues in general usage), and even the purely 'descriptive' approaches have been profoundly marked by the Saussurean concept of language as a system where *tout se tient* ('everything holds together'), a phrase often associated with Saussure, though there is no record of his using it in his Geneva lectures. However, it was used in a lecture delivered by Antoine Meillet in 1906 in reference to Saussure's *Mémoire* (see Meillet 1921: 16).

In establishing synchronic linguistics, Saussure was not engaging in an exercise of scholarly exactitude, but serving notice upon psychologists and others that the general study of language should fall to persons with historically based training in specific languages and language families, rather than to experts in the functioning of the mind. Many of Saussure's statements about language can best be understood in conjunction with this need for establishing the autonomy of linguistic inquiry vis-à-vis adjoining fields.

2. The Primacy of Spoken Language

The idea that speech is the original and primal form of language, and writing a secondary imitation of speech, runs counter to the general popular accordance of greater prestige to writing. Yet the primacy of spoken over written language became embedded in linguistics in the early nineteenth century, doubtless in connection with the Romantic belief that folk traditions embodied the national spirit more deeply than urban practices like writing, which were more subject to external influences. The trend continued over the course of the nineteenth century as linguistics moved away from philology and became increasingly concerned with the gathering of spoken forms from living dialects. By the turn of the twentieth century few linguists would have disputed that the best source for determining the original form of anything in any language was to reconstruct it from its living descendant dialects, and not from written records surviving from intermediate stages.

Saussure formalized the marginalization of written language as well as anyone, and if its survival is often viewed as a Saussurean tradition, it is because he has borne the brunt of the 1967 attack on this marginalization by Jacques Derrida (b.1930). For Saussure, writing is not language, but a separate entity whose only 'mission' is to represent real (spoken) language. The 'danger' of writing is that it creates the illusion of being more real and more stable than speech, and therefore gains ascendancy over speech in the popular mind. Derrida demonstrated the irrationality and internal inconsistency of this extreme phonocentrism; in his deconstructionist wordplay, all language is a kind of 'writing' (in a sense that is unique to Derrida).

But so deeply ingrained is this tradition in twentieth-century linguistics that few linguists saw the need to respond to Derrida, whose critique was summarily dismissed. Well over 10 years passed before linguists began to admit that the marginalization of writing had been carried to an irrational extreme; and despite some tentative steps toward a linguistics of writing in various quarters, this tradition of privileging spoken language—shared though not founded by Saussure—is in no danger of passing away.

3. The Object of Linguistics: *Langue* versus *Parole*

The role of the human will in language production has constituted a problem for linguistic thought at least since Plato's *Cratylus*: humans are constrained by the conventions of language, yet it is through language that will and individuality are shaped and realized. Since modern science is predicated upon the elimination of the will from any object of inquiry, human desire, action, and creation came to be excluded from the 'scientific' study of language. This has necessitated a considerable abstraction of language away from its role in human affairs, treating it as if it existed independently of speakers and speech acts. But here two problems arose: (a) the metaphor of language as organism (which qua metaphor had been fruitfully employed by early nineteenth-century linguists) became extremely attractive as a way of talking about language independently of speakers, and as Michel Bréal (1832–1915) complained in the introduction to his *Essai de sémantique* (1897), the metaphor was taken literally by many people, giving rise to gross misunderstandings; (b) Wundt's *Völkerpsychologie* ('national psychology') seemed to offer a more sophisticated way of dealing with linguistic phenomena: it eliminated the metaphysical abstraction of 'language,' but replaced it with still less satisfactory explanations that revolved around the 'spirit of peoples,' were untestable, and could not sustain any approach to language that was detailed or systematic.

Saussure's contribution was to dissect the total phenomenon of language (*langage*) into (a) actual speech production (*parole*), including the role of the individual will, and (b) the socially shared system of signs (*langue*) that makes production and comprehension possible. Although he spoke of a linguistics of *parole* that would cover the phonetic side of language and the products of individual will, Saussure made it clear that the linguistics of *langue* is the essential, real linguistics. *Langue* is beyond the direct reach of the individual will. Saussure's formulation is both a defense and a refinement of the procedures of traditional grammar and historical linguistics, yet at the same time it stakes out an autonomous realm for general linguistic inquiry.

Despite much debate among scholars as to just what Saussure meant by *langage*, *langue*, and *parole*, the distinction has held firm throughout twentieth-century linguistics. It has been suggested that certain work in stylistics (e.g., by Saussure's disciple Bally) and in discourse pragmatics constitutes an attempt at a linguistics of *parole*, but it is not yet clear how any aspect of language, once it is systematized, fails to enter the sphere of *langue* (see *Geneva School, after Saussure*). The human will remains in exile from linguistics, and *langue* (naturally somewhat evolved from Saussure's original conception of it) continues to be the object of study of virtually every approach to which the name 'linguistics' is accorded (see Sect. 4).

4. *Langue* as a Social Fact

Saussure's insistence upon the social nature of *langue* grew during the years in which he lectured on general linguistics, largely at the expense of psychologically based considerations. Again, this may be tied in part to the need to establish synchronic linguistics independently of the dominant post-Humboldtian psychological establishment. The young science of sociology embodied the spirit of positivism, with which it shared the same recognized founder, Auguste Comte (1798–1857). Positivism was coming to be equated with scientificness in general thought, making classical psychology appear old-fashioned and metaphysical. For the sociologists, Wundt's *Völkerpsychologie*, based on non-empirical generalizations (and more akin to what today would pass as philosophy of mind, not psychology) was already unacceptably passé.

Much ink has been spilled regarding the degree to which Saussure's conception of language was directly influenced by work in sociology, particularly by Emile Durkheim (1858–1917) and Gabriel Tarde (1843–1904). Saussure's former student and lifelong intimate Antoine Meillet (1866–1936) was closely allied with Durkheim and his journal *L'Année sociologique*; and there is often a close correspondence between Saussure's and Durkheim's use of terms like 'social fact' and 'collective consciousness.' But since Saussure never cites Durkheim or Tarde (he was after all teaching a course, not writing a book), support for any claim of direct influence is lacking.

In Saussure's view, *langue* is a 'treasury' or 'collection of impressions' that is 'deposited' in identical form in the brain of each member of a given speech community. He uses the metaphor of a dictionary, of which every individual possesses an identical copy. What the individual does with this socially-shared system falls entirely into the realm of *parole*. This distinction (which was not yet clear to Saussure at the time of his first course in general linguistics of 1907) differentiates Saussure's dichotomy from that between 'competence' and 'performance' established in the 1960s by Noam Chomsky (b.1928). Chomsky explicitly related competence with *langue* and performance with *parole*, though in actual fact the analogy was only partial: for Chomsky, competence (derived from innate universal grammar) is mental and individual, and performance the locus of its social actuation. Furthermore the considerable differences between Saussure's orientation toward language as a semiotic system and Chomsky's toward competence as a mental faculty make any such equations difficult.

Saussure's views on the social nature of language have had a great resonance in linguistics and many other fields. By the mid-1930s it was commonplace to equate 'synchronic linguistics' (indeed, 'scientific linguistics') with 'social linguistics,' and to include under this heading the work of Meillet and his many European disciples, including Alf Sommerfelt (1892–1965) and Joseph Vendryes (1875–1960); the American structuralists Leonard Bloomfield (1887–1949) and Edward Sapir (1884–1939); and even the 'social behaviorists' (or 'pragmatists') John Dewey (1859–1952) and George Herbert Mead (1863–1931). Bloomfield in particular exploited the power of the social as an antidote to the psychological (or 'mentalist') approach at the time of his conversion from Wundtian social psychology to empirical behaviorism (see *American Structuralism*). Beginning in the 1940s dialect geographers such as Raven McDavid (1911–1984) began to realize the crucial importance of social factors in linguistic production; around the same time, the sociologist Paul Hanly Furfey (1896–1992) began training students jointly in the techniques of social class measurement and descriptive linguistics. By the early 1950s inquiry combining empirical sociological and linguistic techniques was underway, to be refined significantly by William Labov (b.1927) and others in the 1960s.

In terms of Saussurean traditions, sociolinguistics pursues the Saussurean view of the social nature of *langue*, while Chomskyan generative linguistics (to which sociolinguistics has stood in irreconcilable contrast for a generation) pursues the Saussurean view of the mental and abstract nature of *langue*. An eventual reconciliation of this split—to which a deeper understanding of Saussure's thought may provide a clue—would certainly constitute a major breakthrough in the understanding of language.

5. *Langue* as a System of Signs: Semiology

The semiological conception of language as a collection of signs (a sign being understood as the collation of a signifying word and a signified concept) was anticipated in the philosophy of Aristotle (384–22 BC), elaborated by the Stoics, and reached its summit in the 'speculative grammar' of the twelfth century. But starting in the fourteenth century, the view of language as a sign system began to cede pride of place to that of language as a social institution, an approach more characteristic of Plato (ca. 429–347 BC), the diffusion of whose works defines the new era of humanism that led to the Renaissance. The semiological perspective was never entirely lost, and would resurface notably among the seventeenth-century British empiricists. But the 'conventional' perspective with which it coexisted periodically overshadowed it, and the early nineteenth century was one such period, when abstract systems disembodied from human activity ceased to be of central interest (see *Aristotle and the Stoics on Language*; *Linguistics in the Later Middle Ages*; *Renaissance Linguistics: An Overview*; *Universal Language Schemes and Seventeenth-century Britain*).

As noted in Sect. 3, abstraction and disembodiment would reemerge as part of the 'scientific' spirit of the later nineteenth century; and it is thus no great coincidence that the 'semiotic' perspective on language was reopened independently by Charles Sanders Peirce (1839–1914) in the USA. Peirce's work in this area, like Saussure's, went unpublished during his lifetime, and was not seriously revived by philosophers until the 1930s. Only in the 1950s and 1960s were attempts made at unifying Saussurean 'semiology' (practiced mostly by European linguists) and Peircean 'semiotics' (practiced mostly by American philosophers) into a single paradigm, under the organizational leadership of Thomas A. Sebeok (b.1920).

For Saussure, the network of linguistic signs which constitute *langue* is made up of the conjunction of a *signifiant* ('signifier'), understood as a sound pattern deposited in the mind, and a *signifié* ('signified'), a concept that is also deposited in the mind. Saussure compares them to the front and back of a single sheet of paper. It is important to note that the signifier is wholly distinct from the actual uttered word, as is the signified from the actual physical thing conceived of (if one exists). Although the distinction between concept and object has existed since antiquity, that between sound pattern and actual sound is Saussure's own contribution, of which some have seen a foreshadowing in the hypothetical 'sonant coefficients' of his early *Mémoire*.

Saussure predicted that *sémiologie*—the study of signs both within and outside of language—would have linguistics as its 'pilot science' (a further challenge to psychology, for the semiological domain is precisely where language is most explicitly mental), and indeed this came to pass in the founding of modern semiotics discussed above. But while linguistics has furnished the paradigmatic model for semiotics, the impact of semiotic inquiry upon linguistics has been slow in coming, with a certain acceleration perceptible in the last decade.

The one place where linguistics has been profoundly affected is in the nearly universal acceptance of Saussure's concept of the signifier as an abstract sound pattern. This view became the cornerstone of the concept of the phoneme as elaborated by Jan Baudouin de Courtenay (1846–1929) and Mikołaj Kruszewski (1851–87) in Russia, and subsequently by N. S. Trubetzkoy (1890–1938) in Vienna and Roman Jakobson (1896–1982) in Brno and Prague; Daniel Jones (1881–1967) in the United Kingdom; and Kenneth L. Pike (b.1912) in the USA, to name only the most prominent figures (see *American Structuralism*; *Firth and the London School of Linguistics*; *Prague School Phonology*). It resulted in the banishment of experimental phonetics from linguistic inquiry in favor of more abstract phonology, based not upon physical differences of sound, but on the ability to distinguish between concepts (see Sect. 8). The distinction between a physical 'etic' level (from phon*etic*) and an abstract 'emic' level (from phon*emic*) would be extended to every level of linguistic structure, and would become a hallmark in particular of postwar American linguistics.

6. The Arbitrariness of Linguistic Signs

As with the semiological nature of language, the arbitrariness of language—the fact that a signifier like the series of sounds /p a j/ has no internal connection with the concept of a 'pie' which it signifies—reflects an ancient doctrine that had never fallen very far from the center of debate about the nature of language up through the end of the eighteenth century. Though not a direct concern for most of the historical linguists of the nineteenth century, the ancient debate between *physis* 'nature' and *nomos* 'convention' in the establishment and operation of language had been revived by Whitney and the Humboldtian psychologists, with Whitney's views of language positioned on the side of *nomos* and the Humboldtians' on the side of *physis*. Saussure, who at age 21 had met Whitney and greatly admired his work, doubtless encountered the debate there.

Saussure's precise formulation of the linguistic sign allows him to situate arbitrariness—which he called the 'first primary concept' of linguistics—precisely at the conjunction of signified and signifier, just as presented in the first sentence of the preceding paragraph. This represented an advance over most earlier formulations of arbitrariness, which (despite Aristotle) focused upon the relationship between the sign as a whole and the real-world objects conceptualized in the signified. Unfortunately, the *Cours* is not consistent in its presentation of arbitrariness, and quickly falls back into the older schema. Another problem with the presentation in the *Cours* is that the arbitrariness doctrine is first encountered in radical form in a very tense, strongly worded, and memorable section; then only later is this tempered with a section on relative arbitrariness that is often ignored, but without which Saussure's conception of language is inaccurately understood. Saussure's point in the later section is that while signifiers are always arbitrary relative to signifieds, they can be motivated relative to other signifiers. Thus, for example, the French numbers *dix-neuf* '19' and *vingt* '20' both show arbitrariness between signifier and signified, yet *dix-neuf* is motivated relative to the numerals *dix* '10' and *neuf* '9' which compose it, hence *dix-neuf* is relatively arbitrary while *vingt* is radically so. (This is connected to Saussure's distinction between syntagmatic and associative relations, discussed in Sect. 8.) Cases of onomatopoeia, where there seems to be a motivated relationship between signifier and real-world analogue, are dismissed as not really part of linguistic systems.

The fact that the *Cours* presents the radical version of arbitrariness first and most forcefully led to its assuming the status of dogma in twentieth-century linguistics (though undoubtedly it also appealed to something deeper in the Zeitgeist). It is one of the first views of language to which budding linguists are exposed in introductory courses and textbooks, often as one of the design features of language identified in 1958 by Charles Hockett (b.1916). Like most dogmas, the radical form of arbitrariness is counterintuitive and requires a certain faith beyond what reason can sustain. Also, it is not always observable in the practice of those who preach it, particularly because of the influence of Jakobson, who beginning in the early 1930s mounted a sustained attack on radical arbitrariness through his work on markedness, child language acquisition, and aphasia, which suggested that linguistic elements differ in naturalness. Jakobson was to have a significant impact upon Chomsky, Joseph Greenberg (b.1915), and many others, with the result that language is not treated as exhibiting anything like the radical arbitrariness of the dogma. Besides Jakobson, arbitrariness was problematized by Louis Hjelmslev (1899–1965), Emile Benveniste (1902–76), and numerous others in a series of attacks on and defenses of the Saussurean view (often poorly represented) appearing from 1939 to about 1947 (*The Glossematic School of Linguistics*; *Trends in Twentieth-century Linguistics*).

7. The Linearity of Signifiers

After arbitrariness, the second primary principle of linguistics for Saussure is that linguistic signifiers are 'linear,' in the sense that, because they have a temporal existence, they represent a dimension that is measurable only as a line. This is one of the more mysterious of Saussure's ideas, in that he never made clear to what he was opposing it (he notes that it is obvious to everyone, but that its implications have not been appreciated). Linearity is part of what distinguishes spoken language as 'real' language, as opposed to writing, a secondary representation that is not necessarily linear (see Sect. 2); and it is what allows us to analyze connected discourse into meaningful units. One also detects a hedging on the inherent psychologism of the semiological view of language as consisting of perfectly juxtaposed signifiers and signifieds: Saussure here insists that signifiers exist in a completely separate dimension.

This principle has given rise to many interpretations. Jakobson formulated his doctrine of distinctive features in phonology—the idea that phonemes are not monoliths, but consist of bundles of features existing simultaneously—as part of a critique of the linearity of the signifier. Others have argued that Saussure's principle is not in disharmony with the concept of constituent features, but rather was intended (a) to deny the accumulation of signifiers, not their decomposition (a distinction which depends upon what one classifies as a signifier); (b) to insist that, however constituted, signifiers cannot be conceived apart from the dimension of time; and (c) to prepare the ground for the introduction of syntagmatic relations (see Sect. 8).

8. Syntagmatic and Paradigmatic Relations: *Langue* as Form, not Substance

Saussure distinguished between the 'syntagmatic' relations a linguistic element has with the elements preceding and following it in an utterance, and 'associative' (now usually called paradigmatic) relations it has to other elements with which it shares partial identity, but which do not occur in the particular utterance at hand. For example, in the sentence *Crime pays* the element *crime* has a syntagmatic relationship with *pays* that determines, among other things, their order relative to one another and the fact that *pays* has the inflectional *-s*. At the same time, *crime* has paradigmatic relations with countless other elements, including the inflectionally related *crimes*, the derivationally related *criminal*, the conceptually related *misdemeanor* (and the conceptually opposite *legality*), and the phonetically related *grime*. As the last example suggests, each sound of the word *crime* /kraim/ has paradigmatic and syntagmatic relations with at least the sounds around it: /k/ is paradigmatically related to the /g/ that could in principle replace it; and syntagmatically related to the following /r/, since in English the presence of /k/ as the initial element of the word immediately restricts the following sound to /l r w/ or a vowel.

Saussure notes that the two types of relations, which correspond to different types of mental activity, contribute in different ways to the 'value' of the sign. In particular, the paradigmatic relations generate a negative value: the identity of the /r/ in /kraim/ is essentially that it could be, but is not, /l w/ or a vowel. This is important because the actual sound that represents /r/ can differ dramatically from one English dialect to another (being rolled, flapped, retroflex, etc.); but the actual sound content does not matter, so long as /r/ is kept distinct from the other sounds to which it is associatively related. *Langue*, Saussure insisted, is form, not substance.

Before Saussure, the syntagmatic relations of morphemes within a given utterance were certainly recognized as a matter of linguistic concern, though relatively neglected. But there was little or no precedent for the idea suggested by the *Cours* (implicitly if not explicitly) that there exists a syntax not only of words, but of sounds, meanings, and the relations uniting them; or that every time a sound, word, or meaning is chosen, a vast network of related elements is summoned up in absentia. The latter concept in particular set the study of language on a new course of abstraction that did not rely on psychological theorizing, but remained internal to language.

In many ways, the Saussurean notion of paradigmatic and syntagmatic relations would become the hallmark of twentieth-century linguistics: first, because it proposed that a single principle of structure unites all the levels at which language functions—sound, forms, and meaning; second, because it suggested a way of analyzing language that would not depend on a simple listing of elements with their 'translation' into either another language or some sort of philosophical interpretation. Elements could henceforth be analyzed according to the relations they maintained with other elements, and the language could be understood as the vast system—not of these elements—but of these relations. This was the point of departure for structuralism (see Sect. 9).

To a large extent, the distributional method developed by Bloomfield is a working out of this Saussurean notion, with special emphasis on the paradigmatic relations. With the work of Bloomfield's follower Zellig S. Harris (1909–92) the syntagmatic relations assumed a status of equal importance, and with Harris's student Chomsky, overriding importance. (Regarding word order, Saussure's view is that the syntagmatic relations constitute that part of syntax which is predetermined—like the use of a 3rd person singular verb form after the singular subject *crime*—and so a part of *langue*; while the rest of syntax, being subject to free combination, is relegated to *parole*.)

9. The Systematicity of *Langue:* Structuralism

Certainly the most wide-reaching Saussurean intellectual tradition, both within and outside of linguistics, derived from Saussure's characterization of *langue* as a wholly self-contained network of relationships among elements which, as discussed above, have no positive content or value, but only the negative value generated by their differing from one another. Like most of his contemporaries, when Saussure thought of language he thought first of sounds and their combinations, and extrapolated outward from that level. The study of sounds had for several decades been a battleground between those who, later in the twentieth century, would be called the 'phoneticians,' proponents of an extreme form of positivism who believed that the key to understanding language lay in ever more precise measurement of sound waves and vocal apertures; and those who would now be called 'phonologists,' who preferred to operate on a more abstract (and traditional) plane, dealing with classes of sounds rather than the minute differences within classes. But the phoneticians were steadily gaining prestige, since their positivistic approach had the characteristic look of modern science.

As noted in Sect. 4, Saussure was attracted to positivism, but within limits. If psychology represented the Scylla of hyperrationalism, experimental phonetics was the Charybdis of hyperempiricism, equally to be avoided. Perhaps more so: whereas Saussure never attempted a complete divorce of language from the domain of the mind, his characterization of *langue* as a network of pure relations, of form and not substance, succeeded in marginalizing phonetics to the point that within a few decades it would retreat to the position of an auxiliary discipline to linguistics. The term *phonème*, used by Saussure as early as 1878 (five years after its coinage by A. Dufriche-Desgenettes, 1804–79) to denote an abstract unit representing sound, but never actually defined by him, was taken up by Baudouin de Courtenay and Kruszewski and joined to an essentially Saussurean conception: 'phoneme' became the name for Saussure's abstract mental sound pattern, identifiable as the minimal unit of sound capable of changing the meaning of a signifier in a language. It eventually became the basis for further, related new concepts: the morpheme (coined by Baudouin de Courtenay) or moneme (minimal unit of meaning), tagmeme (minimal meaningful unit of syntax), toneme, and so on.

The full implications of Saussure's view of *langue* were realized in Prague, principally by Trubetzkoy, who elaborated complete phonological schemata for a panoply of languages from all over the world; and Jakobson, who extended the implications of 'functional' phonology to other domains of linguistic (and literary) inquiry. But strikingly similar projects were underway in other quarters: in the USA with Bloomfield, who saw himself as at least partly under the influence of Saussure (in a 1945 letter he described his major work *Language* as showing Saussure's influence 'on every page'); in Denmark, with the overtly Saussurean glossematics of Hjelmslev; in France, where Meillet had transmitted the Saussurean perspective to a whole generation of students, including André Martinet (b.1908); Gustave Guillaume (1883–1960); and Benveniste (see *American Structuralism*; *Guillaumean Linguistics*; *The Glossematic School of Linguistics*; *Functional Grammar*). All the lines of affiliation among these 'schools' are not yet clear. But their work came to define the mainstream of linguistics in the twentieth century, and all of it assumes the conception of *langue* set out in the *Cours*.

The idea that language forms a self-contained system justified the autonomy of linguistic study not only vis-à-vis phonetics, but every other discipline as well, including psychology, anthropology, and sociology (the latter, again, was never deemed a threat). The only discipline under whose aegis it hypothetically fell was semiology, but even had semiology existed, the status of linguistics as its pilot science meant that it yielded its autonomy to no other field. The origins of 'structuralism' are generally traced to turn-of-the-century work by the Anglo-American psychologist E. B. Titchener (1867–1927). But by the period between the 1940s and the 1960s when most fields of human knowledge came under the domination of structuralism, it had come to be seen as the extrapolation out of linguistics of Saussure's concept of *langue* as a self-contained system of syntagmatic and paradigmatic relations among elements of negative content (see *Trends in Twentieth-Century Linguistics*). Its most widely heralded application was in the field of anthropology, by Claude Lévi-Strauss (b.1908), who discovered Saussure in 1942 in a course taught by Jakobson. Other areas and their most prominent structuralist practitioners include, in biology, Ludwig von Bertalanffy (1901–72) and C. H. Waddington (1905–75); in literary theory, Roland Barthes (1915–1980); in Marxist theory, Louis Althusser (1918–90); in mathematics, 'Nicholas Bourbaki' (the pseudonym of a group of French mathematicians); in psychoanalysis, Jacques Lacan (1901–79); and in psychology (where Titchener's concept of structure had long since been replaced, for example by the concept of *Gestalt*), Jean Piaget (1896–1980). The rejection of structuralism by such figures as Jacques Derrida and, to a lesser degree, Michel Foucault (1926–84), became tied up with the French student revolts of 1968, launching the 'poststructuralist' era, whose very name indicates that the Saussurean tradition remains an active force even when shaping the direction of reactions against it.

Within linguistics, the effects of poststructuralist thought are only beginning to be felt; the field in which structuralism began is the last to let it go. Precisely at midcentury the great British linguist J. R. Firth (1890–1960) was able to state that 'Nowadays, professional linguists can almost be classified by using the name of de Saussure. There are various possible groupings: Saussureans, anti-Saussureans, post-Saussureans, or non-Saussureans.' As we approach the twentieth century's end, the only change one is tempted to make to Firth's statement is to remove 'non-Saussureans,' as it is doubtful that any survive. All work on or against language as an autonomous, self-contained system—and this includes work in generative grammar, universal–typological linguistics, discourse pragmatics, and sociolinguistics—falls squarely within the most important of Saussurean traditions.

Bibliography

Aarsleff H 1982 *From Locke to Saussure*. Athlone, London

Culler J 1986 *Ferdinand de Saussure*, 2nd edn. Cornell University Press, Ithaca, New York

Engler R 1968/1974 *Edition critique du Cours de linguistique générale de F. de Saussure*. Harrassowitz, Wiesbaden

Gadet F 1989 *Saussure and Contemporary Culture*. Hutchinson Radius, London

Harris R 1987 *Reading Saussure*. Duckworth, London

Holdcroft D 1991 *Saussure: Sign, Systems and Arbitrariness*. Cambridge University Press, Cambridge

Joseph J E 1988 Saussure's meeting with Whitney, Berlin, 1879. *Cahiers F. de Saussure* **42**: 205–13

Koerner E F K 1973 *Ferdinand de Saussure: Origin and Development of his Linguistic Thought in Western Studies of Language*. Vieweg, Braunschweig

Koerner E F K 1988 *Saussurean Studies/Etudes saussuriennes*. Slatkine, Geneva

Meillet A 1921 *Linguistique historique et linguistique générale*. Champion, Paris

Saussure F de 1916 *Cours de linguistique générale*. Payot, Lausanne

Saussure F de 1922 *Recueil de publications scientifiques*. Sonor, Geneva

Saussure F de 1972 *Cours de linguistique générale*. Payot, Paris

Saussure F de 1983 *Course in General Linguistics*. Duckworth, London (Transl. by Harris R)

Geneva School, after Saussure

René Amacker

The 'Geneva School of Linguistics,' a term first used in print by Charles Bally in 1908, may be said to comprise a fairly large number of linguists including—besides Ferdinand de Saussure—all his direct and indirect disciples in Geneva. They form three generations, the chief representatives being first Charles Bally (1865–1947) and Albert Sechehaye (1870–1946), then Henri Frei (1899–1980), Robert Godel (1902–1984), and Serge Karcevski (1884–1955), and finally Luis J. Prieto (b.1926) and René Amacker (b.1942); the third generation also includes Rudolf Engler (b.1930), although he has worked in Bern during his entire career.

The Geneva School, thus defined by an essentially geographic link, constitutes but a part of a much wider movement which looks to Ferdinand de Saussure for its inspiration in various respects; its most significant representatives are Antoine Meillet (1866–1936) and several of his students in France, Nikolai Trubetzkoy (1890–1938) and the Prague Circle, Louis Hjelmslev (1899–1965) and the Copenhagen Circle, the Belgian Eric Buyssens, Hideo Kobayashi (1903–78) in Japan, the Frenchman André Martinet (b.1908) and the functionalists following him, Bertil Malmberg (b.1913) in Sweden, the Romanian Eugenio Coseriu (b.1921, living in Germany since 1962), Tullio De Mauro in Italy, Konrad Koerner in Canada, Ludwig Jäger in Germany, and many other scholars throughout the world.

1. A School without a Leader

Compared with the other linguistic movements (from Glossematics to Generative Grammar, from Tagmemics (see *Tagmemics*) to Functionalism), the Geneva School is atypical in its outlook. First, Saussure himself had never intended to form a school, producing disciples who would spread his theories, neither with regard to historical linguistics nor with regard to his in fact revolutionary nonhistorical (synchronic) linguistic proposals. The designation 'Geneva School' was introduced by Charles Bally in 1908, taking up a casual remark made in 1894 by Michel Bréal (1832–1915) at the 10th International Congress of Orientalists held in Geneva. Another characteristic is that each representative of the 'Geneva School' is scientifically independent, to the extent that it is difficult to find a global description which could be valid for the entire group.

2. The First Generation

The posthumous publication of Ferdinand de Saussure's *Cours de linguistique générale* in 1916 is, in a way, the Geneva School's manifesto: after Saussure's death in 1913, Charles Bally and Albert Sechehaye, with the help of Albert Riedlinger (1883–1978), collected all available notes, interpreted them, and made a valiant effort to reconstruct what Saussure had taught in 1907, 1908–09 and 1910–11. These teachings had only been known through students' notes and a few handwritten notes by Saussure himself. Although Bally and Sechehaye had attended Saussure's courses on comparative grammar for some time, neither had followed those on general linguistics.

In 1916 these two linguists were already well-established scholars in their own right: Sechehaye for his work *Programme et méthodes de la linguistique théorique* (1908), which strongly influenced the young Hjelmslev (cf. Hjelmslev 1928), and Bally for his *Précis de stylistique* (1905) and particularly his celebrated *Traité de stylistique française* (1909). The ideas put forth in the *Cours* thus influenced these two linguists, though by no means uniformly; each of them would adopt and adapt Saussure's teachings very differently in his own works (cf. Engler 1987).

Charles Albert Sechehaye (1870–1946), unjustly forgotten nowadays, said he had in common with Saussure 'a taste for lofty abstractions and theories which go beyond facts'; he was principally interested 'in the logical aspects of things' (cf. 1927: 234, 235), that is to say language organization, use, and evolution. This self-assessment is fundamentally correct as regards the 1908 work with its theory of the 'embedding' of linguistic disciplines, and applies as well to the *Essai sur la structure logique de la phrase* (1926), or the theoretical articles which he published after *Programme et méthodes* (e.g., Sechehaye 1917). Already in his doctoral thesis of 1902 on the French imperfect subjunctive, submitted at the University of Göttingen, and his didactic publications, the same 'concern for organization and system' (cf. 1927: 234) can be felt (cf. Fryba-Reber 1994). When Charles Bally retired in 1939, Sechehaye inherited his chair, which originally had been Saussure's.

Charles Bally (1865–1947), whose reputation is still very much alive, was, by contrast, a born artist (in his youth, he had toyed with the idea of becoming a pianist) and an effective pedagogue. As a Hellenist, he wrote his first work, a dissertation at the University of Berlin, on the lyrical parts of the tragedies of Euripides (1889) as well as his last book, the *Manuel d'accentuation grecque* (1945). He studied comparative grammar from 1892 to 1904 under Saussure in Geneva (and for one academic year under Meillet in Paris), while teaching Greek at secondary-school level, and above all 'French stylistics based on translations from German to French' at the Séminaire de français moderne in Geneva (established in 1891); he later repeatedly acknowledged that the whole of his stylistics derived from these teachings.

The term 'stylistics' is not well-chosen and has given rise to numerous misunderstandings. For Bally, this branch of learning does not study the individual style of literary authors, but all that is general and regular in the expressive phenomena of the current spoken language, that is, the lexical or syntactic phenomena which through speech convey the speakers' emotions (their affectivity) and reveal their social background—namely everything which introduces life into their language (cf. Bally 1913).

The tendency to theorize—a secondary trait of his work and one which he approached with 'a certain hesitation' (Sechehaye 1926b: 277)—can be noticed before 1913 in his—abortive—attempt to turn stylistics into an autonomous science. He had a second chance, however, to elaborate an original theoretical synthesis, with more success, on discovering in 1913 Saussure's views on synchronic and theoretical linguistics. This launched him into teaching general linguistics after his appointment to Saussure's chair (while still covering Sanskrit and comparative grammar as well): in his *Linguistique générale et linguistique française* (1932) he not only analyzed the sentence in a subjective *modus* (the modality of utterance) and a communicative *dictum* (the content of utterance)—opening the door to pragmatics—but also managed, after some 30 years of work, to fulfill the dream outlined in his *Précis de stylistique* (1905), namely, to establish a scientific characterization of French in some of its fundamental tendencies.

Another contrast is apparent between Bally and Sechehaye as regards their activities in the didactic field. Except for the important collection of exercises constituting the second volume of the *Traité de stylistique* of 1909 and the updating of a lexical dictionary for primary schools (Pautex 1909), Bally published nothing directly usable for teaching purposes; however, he continued to present his views on principles to be followed in teaching a mother tongue (e.g., 1911, 1930). These views were first considered, in Geneva, to be 'revolutionary' (and therefore as inapplicable in practice as interesting in theory), but eventually won some degree of posthumous acceptance, in particular in his native city.

Sechehaye for his part favored the 'constructive method' in language teaching (cf. 1916); he used it as a basis for planning an *Abrégé de grammaire française* (1926) for the pupils of Swiss German secondary schools. Earlier, he had published in connection with his courses at the Geneva Séminaire de français moderne the three parts of his *Eléments de grammaire historique du français* (1909–10), whose 'Introduction' suggests a subtle influence of Ferdinand de Saussure.

Finally, as regards the descriptive applications of Saussurean linguistics, mention should be made, besides the second part of Bally's *Linguistique générale et linguistique française*, of the two theses devoted to the Greek of the New Testament by Paul Regard, a student of both Saussure and Meillet (1919a, 1919b).

3. The Second Generation

Among Bally's students, three became famous in linguistics in the middle of the twentieth century. Henri Frei (1899–1980) achieved celebrity through his *Grammaire des fautes* (1929), giving a description of 'advanced French' based on an original conception of language. It is a synthesis of the Saussurean dichotomies (particularly associative-syntagmatic relationships renamed 'memorial' and 'discursive') and of Bally's fundamental tendencies of language (defined by Frei as 'needs': need for assimilation, differentiation, brevity, invariability, and expressivity). According to Frei, breaches of linguistic standards are explained essentially by the interplay of those needs. The expression 'functional linguistics,' later so strongly taken up in Europe and in America, appeared, probably for the first time, in the introduction of his book; however, the *Grammaire des fautes* defines functionalism as a teleological—that is, dynamic and goal-oriented—theory of language.

Having spent some 10 years in the Far East, especially in Tokyo (where Hideo Kobayashi had just translated Saussure's *Cours* in 1928), Frei came back to Geneva at the beginning of World War II and was nominated to the chair of general linguistics in 1945. Thereafter he concentrated his efforts chiefly on descriptive syntax, trying to define it within a Saussurean framework, mainly contrasted with the views of Leonard Bloomfield and Louis Hjelmslev. His methods were based on a corpus of 2,000 sentences (Frei 1941, 1952) that he used in his studies of Chinese, for example (1956, 1957). For Frei as for 'classic' structuralists, syntactic relationships can be reduced to the notion of dependency, as identified by the substitution criterion (cf. Frei 1968); he is original in the way in which he applies this criterion, without yielding to the suggestions of traditional grammar. In his representation of dependency relationships, he made use of graphs very different from the more usual 'trees' (cf., e.g., Frei 1956). Although one must regret that he did not produce any synthesis of his views on the subject (cf. Amacker 1980), this need will be met largely by the republication of his most significant papers (Frei 1996). Frei had many students, mostly foreigners, who applied his corpus and the principles of his syntactic theory to various languages, including English, Asante (a dialect of Akan), and Latvian.

Serge Iosifovič Karcevski (1884–1955), one of the (foreign) founders, with Nikolai Trubetzkoy and Roman Jakobson, of the Prague Circle in 1926, had prepared his doctoral thesis (1927) under Bally; his studies on the Russian verb are still authoritative. But his importance in the Geneva School lies above all in his taking the initiative, in the spring of 1940, to convene meetings of linguists in Geneva, first informally and later officially, through the creation of the Société genevoise de linguistique (1940–56); the Society—first chaired by Charles Bally (for 1941, then chairman *ad honorem*) and subsequently (1942–46) by Albert Sechehaye and last (1947–56) by Robert Godel—was replaced in February 1957 by the Cercle Ferdinand de Saussure. The Society decided to publish a journal to provide a forum for the discussion of Saussurean ideas: the *Cahiers Ferdinand de Saussure* (from 1941).

Robert Godel (1902–84) was the most philologically minded of the Geneva linguists; he was professor of Latin at the University, a specialist in classical Armenian, and author of a Turkish grammar (1945) and of an elementary course in Latin (1951), in both of which the influence of the Saussurean linguistics is fairly evident. However, he is more known for his study of the sources of Saussure's *Cours* (1957), a book which marked the beginning of research into the authentic Saussure, whose views had not always been clearly presented by Bally and Sechehaye in their edition of the *Cours*. In the same year, 1957—the Saussure centenary—Godel published the *Introduction* to the second course of general linguistics given by Saussure (in 1908–1909), probably the most characteristic of Saussure's theoretical reflections.

4. The Third Generation

After syntax, semantics had to be approached in greater detail and in accordance with the principles laid out in the *Cours*. Along the lines of Prague School phonology, the Argentinian Luis Jorge Prieto (b.1926), who succeeded Frei in Geneva in 1969, built a semantic framework based on the general semiological notion of 'relevance' (*pertinence*). After the publication of *Principes de noologie* (1964) and *Messages et signaux* (1966), Prieto continued to elaborate these notions (e.g., 1975a, 1975b). In the early 1990s, the latest developments of his views have become a true theory of knowledge (cf. Prieto 1989): Prieto considers his own research as an explication of the Saussurean epistemology which he thinks can be applied to all human sciences.

Taking up a suggestion by Robert Godel (1957), Rudolf Engler (b.1930) published, between 1967 and 1974, all the sources of Saussure's *Cours* in a critical synoptical edition, showing for every sentence of the book compiled by Bally and Sechehaye what the students had noted. On that basis, and pending publication of the index to the critical edition, Engler compiled a valuable *Lexique de la terminologie saussurienne* (1968). Moreover, he pursued a work of minute philological analysis and theoretical clarification (for example, Engler 1962, on the arbitrariness of the sign) to illustrate his main thesis that, as regards linguistics, the history of ideas is part of the very substance of scientific knowledge, from which it cannot be separated.

In his *Linguistique saussurienne* (1975), an attempt at a synthesis based on Engler's edition and the commentary of the *Cours* provided by Tullio De Mauro (1967), René Amacker (b.1942) insisted on the need for distinguishing a semiological level of language (where the units are defined in relation to each other as 'terms of the system') from a strictly linguistic level (where the units of the system receive their grammatical and syntactic categorization) in Saussure's conception of language. Amacker considers this conception as 'constructivist' (in the sense given to this term by Jean Piaget). In addition, in order to test his essentially sceptical conception of syntax, he studied the 'morphology' of syntactic constructions in two Latin texts, insisting on the intrinsic role of what he called the 'descriptive arbitrariness' in the linguist's practical activity (Amacker 1986).

5. Appraisal and Prospects

It is apparent from the above that the 'Geneva School' has no particular unity of doctrine. However, it is possible in retrospect to discover a denominator common to the various representatives of the School: they all share the conviction, inherited from Saussure, that the sign theory is the heart of linguistics. This leads to what might be called, from the epistemological viewpoint, a 'semiological linguistics.'

The second common point is that, for the majority of the Genevan linguists, language is a basically sociohistorical phenomenon, that is to say neither purely biological, nor purely conventional (as mathematical systems). As a consequence, they think that its study must be in principle both historical and structural, philological and systematic, semantic and formal, and even—though this aspect no longer seems to be so topical in their practice at the time of writing—sociological and psychological.

Given this general outlook, it is clear why the members of the Geneva School have never felt comfortable with the 'radical' structuralist currents with their emphasis on the form of the expression (the *signifiant*) to the neglect of the meaning side of linguistic sign (the *signifié*), and with the privilege attributed to synchrony to the detriment of the historical aspect of language. In the final analysis, by taking into account, at one and the same time, the language system, the speakers' community (Saussure's *mass parlante*) and the diachronic dimension of language, the School is best defined by what might be called 'humanist linguistics.'

Bibliography

Amacker R 1975 *Linguistique saussurienne*. Droz, Geneva

Amacker R 1980 *In memoriam* Henri Frei: L'oeuvre syntaxique. *Cahiers Ferdinand de Saussure* **34**: 127–42

Amacker R 1986 *Structures et conventions*. Albert Meynier, Turin

Bally C 1889 *De Euripidis tragoediarum partibus lyricis quaestiunculae*. Pormetter, Berlin

Bally C 1905 *Précis de stylistique*. Eggimann, Geneva

Bally C 1908 Maître et disciples. *Journal de Genève* July 18: 32–33

Bally C 1909 *Traité de stylistique française*, 2 vols. Winter, Heidelberg

Bally C 1911 La stylistique et l'enseignement secondaire. In: Butts, et al. *Les leçons de français dans l'enseignement secondaire*. Foyer Solidariste, Saint-Blaise

Bally C 1913 *Le langage et la vie*. Atar, Genève/Winter, Heidelberg (3rd expanded edn. 1952 Droz, Genève/Giard, Lille)

Bally C 1930 *La crise du français: Notre langue maternelle à l'école*, 5 lectures. Delachaux, Neuchâtel

Bally C 1932 *Linguistique générale et linguistique française*. Leroux, Paris (2nd rev. edn. 1944 Francke, Berne)

Bally C 1945 *Manuel d'accentuation grecque*. Francke, Berne

De Mauro T 1967 Note. In: Saussure F de *Corso di linguistica generale*. Laterza, Bari (Transl. by De Mauro T)

Engler R 1962 Théorie et critique d'un principe saussurien: l'arbitraire du signe. *Cahiers Ferdinand de Saussure* **19**: 5–66

Engler R 1968 *Lexique de la terminologie saussurienne*. Spectrum, Utrecht

Engler R 1976 Bibliographie saussurienne. *Cahiers Ferdinand* *de Saussure* **30**: 99–138 (1977 **31**: 279–306; 1979 **33**: 79–145; 1986 **40**: 131–200; 1989 **43**: 149–275)

Engler R 1987 Die Verfasser des *Cours de linguistique générale*. In: Schmitter P (ed.) *Zur Theorie und Methode der Geschichtsschreibung der Linguistik*. Narr, Tübingen

Frei H 1929 *La grammaire des fautes*. Geuthner, Paris

Frei H 1941 Qu'est-ce qu'un dictionnaire de phrases? *Cahiers Ferdinand de Saussure* **1**: 43–56

Frei H 1947 La linguistique saussurienne à Genève depuis 1939. *Word* **3**: 107–09

Frei H 1952 *Le livre des deux mille phrases*. Droz, Geneva

Frei H 1956, 1957 The ergative construction in Chinese: Theory of Pekinese *pa*^{3}. *Gengo Kenkyu (Journal of the Linguistic Society of Japan)* **31**: 22–50; **32**: 83–115

Frei H 1966 Modes de réduction des syntagmes. *Cahiers Ferdinand de Saussure* **22**: 41–51

Frei H 1968 Syntaxe et méthode en linguistique synchronique. In: Thiel M (ed.) *Enzyklopädie der geisteswissenschaftlichen Arbeitsmethoden*, vol. 4: *Methoden der Sprachwissenschaft*. Oldenburg, Munich

Frei H 1996 *Vingt-quatre écrits sur la syntaxe*. Cercle Ferdinand de Saussure, Geneva

Fryba-Reber A-M 1994 *Albert Sechelaye et la syntaxe imaginative: Contribution à l'histoire de la linguistique saussurienne*. Droz, Geneva

Godel R 1945 *Grammaire turque*. Ecole d'interprètes, Geneva

Godel R 1951 *Cours élémentaire de latin*. Georg, Geneva

Godel R 1957 *Les sources manuscrites du* Cours de linguistique générale *de F. de Saussure*. Droz, Geneva

Godel R 1961 L'Ecole saussurienne de Genève. In: Mohrmann C, Sommerfelt A, Whatmough J (eds.) *Trends in European and American Linguistics (1930–1960)*, vol. 1. Spectrum, Utrecht

Godel R 1966 F. de Saussure's Theory of Language. *Current Trends in Linguistics*, vol. III, 479–93. Mouton, The Hague

Godel R (ed.) 1969 *A Geneva School Reader in Linguistics*. Indiana University Press, Bloomington, Indiana

Hjelmslev L 1928 *Principes de grammaire générale*. Bianco Lunos, Copenhagen

Karcevski S I 1927 *Système du verbe russe: Essai de linguistique synchronique*. Plamja, Prague

Koerner E F K 1972 *Bibliographia Saussureana 1870–1970: An Annotated, Classified Bibliography on the Background, Development and Actual Relevance of Ferdinand de Saussure's Theory of Language*. Scarecrow Press, Metuchen, New Jersey

Mourelle-Lema M 1966 The Geneva School of Linguistics: A biobibliographical record. In: Godel R (ed.) 1969

Pautex B 1909 *Recueil de mots français par ordre de matières accompagné d'une notice orthographique*, 52nd edn. Pautex-Ruffini, Geneva

Prieto L J 1964 *Principes de noologie*. Mouton, The Hague

Prieto L J 1966 *Messages et signaux*. Presses Universitaires de France, Paris

Prieto L J 1975a *Pertinence et pratique: Essai de sémiologie*. Editions de Minuit, Paris

Prieto L J 1975b *Etudes de linguistique et de sémiologie générales*. Droz, Geneva

Prieto L J 1989 *Saggi di Semiotica, I: Sulla Conoscenza*. Pratiche Editrice, Parma

Regard P 1919a *Contribution à l'étude des prépositions dans le Nouveau Testament*. Leroux, Paris

Regard P 1919b *La phrase nominale dans la langue du Nouveau Testament*, Leroux, Paris

Saussure F de 1916 *Cours de linguistique générale*. Payot, Paris (Ed. by Bally C, Sechehaye A, Riedlinger A. Transl. 1959 as *Course in General Linguistics*. Philosophical Library, New York)

Saussure F de 1957 *Cours de linguistique générale (1908–1909)*. In: Godel R (ed.) Introduction (d'après des notes d'étudiants). *Cahiers Ferdinand de Saussure* **15**: 3–103

Saussure F de 1967–74 *Cours de linguistique générale*. (Edition critique de R. Engler.) Harrassowitz, Wiesbaden

Sechehaye A 1902 *Der Konjunktiv Imperfekti und seine Konkurrenten in den normalen hypothetischen Satzgefügen im Französischen: Einleitung und dritter Teil*. Kästner, Göttingen

Sechehaye A 1908 *Programme et méthodes de la linguistique théorique: Psychologie du langage*. Champion, Paris

Sechehaye A 1909–10 *Eléments de grammaire historique du français*. Eggimann, Geneva

Sechehaye A 1916 La méthode constructive en syntaxe. *Revue des Langues Romanes* **59**: 44–76

Sechehaye A 1917 Les problèmes de la langue à la lumière d'une théorie nouvelle. *Revue de Philosophie* **42(10)**: 1–30

Sechehaye A 1926a *Essai sur la structure logique de la phrase*. Champion, Paris

Sechehaye A 1926b *Abrégé de grammaire française sur un plan constructif*. Sekundarlehrerkonferenz des Kantons Zürich, Zürich

Sechehaye A 1927 L'Ecole genevoise de linguistique générale. *Indogermanische Forschungen* **44**: 217–41

Sechehaye A 1940 Les trois linguistiques saussuriennes. *Vox Romanica* **5**: 1–48. Repr. in: Godel R (ed.) 1969

Neolinguistic School in Italy

Jörn Albrecht

From the point of view of the late twentieth-century epistemological paradigm adopted by the majority of Western linguists, especially in the Anglo-Saxon world, the Neolinguistic School in Italy seems to be somewhat 'out of place'—a strange phenomenon belonging to a remote past and deserving, if any, exclusively historical interest. Few will care about scholars who called themselves 'linguists,' but who never did any remarkable work in such important fields as phonology, morphology, and syntax, and who emphasized the part played by the individual in the language and neglected, denied even, its supra-individual and, therefore, its systematic aspect.

It should be remembered that the tenets of the Italian Neolinguists, as they called themselves, met with a wide response in the domain of comparative linguistics not only in Europe, but also in the USA. It is important to note that the influence exercised by the Neolinguists on the general climate of opinion in linguistics and in philology has been significant in Italy. The neolinguistic movement reinforced the strong 'antipositivistic' current which had its origin in the philosophy of Giambattista Vico (1668–1744) and which—due to the immense influence of the 'idealistic' philosophy of Benedetto Croce (1866–1952)—dominated Italian intellectual life in the first half of the twentieth century.

Discussing all the philosophical implications of the Neolinguists' conception of language in detail is impossible within the present confines. The focus therefore will be on less theoretical topics such as (a) the external history of the Neolinguistic School, that is to say some basic information about the members of the movement and their activities; (b) the essential issues of neolinguistic thought in the fields of language theory and comparative linguistics; and (c) the reception and critique which the Neolinguists received from their peers outside the movement.

1. The External History of the Neolinguistic School

The name 'Neolinguist' was coined in opposition to 'Neogrammarian' (*Junggrammatiker*), originally a nickname given to the well-known linguistic school of Leipzig. As the term suggests, stress was laid on 'linguist' as against 'grammarian.' In a later phase of his scientific career, Bartoli (1945) preferred the more technical designation of 'areal linguistics' (*linguistica spaziale*).

A Neolinguistic School in a strict sense never existed. The movement arose from the collaboration of two scholars, Matteo Bartoli (1873–1946) and Giulio Bertoni (1878–1942) from the early 1920s onwards (see Bartoli & Bertoni 1925). Only the former was a linguist in the more technical sense of the term; the greater part of Bertoni's writings may be described as language theory or philosophy rather than linguistics. Both scholars were Romanists and therefore they applied their principles primarily to Romance languages; however, they could not resist the temptation to extend their activities to the field of Indo-European comparative philology—as for instance to the classical problem of the division between *centum-* and *satem-*languages (see Bartoli 1925: 50; Bartoli 1945: 1–31).

Neolinguistic thought was inspired by two main sources: on the one hand, by the philosophy of Benedetto Croce whose main ideas can be traced back to Humboldt, Hegel, Vico, Leonardo da Vinci, and other important thinkers; on the other hand, by a number of outstanding linguistic geographers as for instance Graziadio Isaia Ascoli (1829–1907); Hugo Schuchardt (1842–1927), and last but not least Jules Gilliéron (1854–1926), scholars who preceded the Neolinguists in their staunch opposition to the assumption of regularity of 'phonetic laws,' one of the main pillars of neogrammarian doctrine.

As the bibliography indicates, the most important writings of the members of the school lay in the field of comparative Romance linguistics, and in areas probably of a lesser interest today, especially in respect to examples given to illustrate the 'norm of the lateral areas' (see below).

The Neolinguistic School did not really survive its most important representative, i.e., Matteo Bartoli. Other scholars who are occasionally cited as members of the school (such as Karl Vossler, Hugo Schuchardt, and Leo Spitzer—all listed as Neolinguists in the *Glossary of Linguistic Terminology* by Mario Pei) are to be considered predecessors or 'sympathizers' rather than members of the school. Neolinguists cannot be identified with 'idealistic philologists,' on the one hand, or linguistic geographers, on the other. However, there were a number of important Italian philologists who felt indebted to the Neolinguists; e.g., Mario Fubini (1900–77), Alfredo Schiaffini (1895–1971), Benvenuto Terracini (1886–1968). Other scholars—despite some fundamental theoretical disagreements—shared at least their 'antipositivistic' convictions, e.g., Bruno Migliorini (1896–1973), Antonino Pagliaro (1898–1974), and Giacomo Devoto (1898–1974), 'a friend tho not a follower of Bartoli' (Devoto 1947: 208). The only true and loyal follower of Bartoli—and therefore the only one who has continued the neolinguistic tradition up to the present day—has been Giuliano Bonfante (b.1904).

2. The Essential Issues of the 'Neolinguistic Position'

2.1 *The 'Antipositivistic' Background*

Despite frequent affirmations of agreement with and continuation of 'idealistic' principles there exists only a consensus *ex negativo* between the Neolinguists and the followers of Croce and Vossler: the rejection of any kind of positivistic conception of language. Language is neither an 'organism' nor a '*fait social*' nor any other kind of entity separate from man. 'It is man who creates language, [...] language is not imposed upon man like an exterior, ready-made product of mysterious origin' (Bonfante 1947: 346). Consequently, the Neolinguists were particularly hostile to the widespread practice of operating with 'invented' designations for hypothetical language-stages without any historical evidence, such as 'Indo-European' or 'West Germanic,' and they denied the utility of the so-called 'starred forms' as for instance Vulgar Latin **lacte*(*m*) 'milk,' a hypothesized form adduced in order to 'explain' Romance forms like French *lait*, Spanish *leche*, Portuguese *leite*, Italian *latte*, and so on, which cannot be derived directly from the Classical Latin word *lac*.

In the opinion of the Neolinguists, language is a thoroughly conscious phenomenon. The distinction between the domain of phonetics, which is more or less inaccessible to the consciousness, and the will of the speaker and therefore subject to sound laws operating with blind necessity, on the one hand, and the domain of morphology and lexicon, on the other, which is partly accessible to the consciousness and the will of the speaker—a distinction characteristic not only of the Neogrammarian but also the Saussurean view of linguistics—is strongly denied by the members of the school (see Bartoli 1925: 96–97). Further, the usual distinction between different levels of language analysis such as phonetics, morphology, syntax and so on does not correspond, in the view of the Neolinguists, to any real division in the language itself. 'Men speak with words, or better, with sentences—not with phonemes, morphemes, or syntagmemes, which are our own abstractions and have no independent existence' (Bonfante 1947: 351). But in contrast to Bertoni and the German 'idealistic' philologists, who tried to translate Croce's theoretical conception of language as an 'intuitive' and individual creation into the reality of their empirical investigations, Bartoli, especially during the last years of his life, was well aware of the fact that a linguist cannot do his work without the help of a systematic conceptional framework, and so he considers the 'idealistic' philologists following Vossler to be 'language philosophers' (*glottosofi vossleriani*), who would do better to keep out of the field of linguistics proper (Bartoli 1925: 64).

2.2 The Areas of Neolinguistic Activity

The technical part of the productivity of the Neolinguistic School may be characterized as a kind of comparative linguistics which—in contrast to the classical understanding of the discipline—tries to take into account the geographical, historical, and social environment of the linguistic activity. Preference is given to the dedicatedly historical against the merely 'diachronical' point of view (see Devoto 1947: 211), a distinction which finds its counterpart in the substitution of 'grammarian' for 'linguist': the former dealing only with bare abstractions which cannot account for the language in its full reality which the second is concerned with (see Bonfante 1947: 367). To illustrate their views Neolinguists patently draw their examples from the lexicon—and only to a minor degree from the morphology—of Romance and Indo-European languages.

2.3 Neolinguists on Linguistic Change

In the light of the Neolinguists' conception of language as an individual, largely aesthetic, creation, linguistic change does not represent a problem which must be 'explained'; it is, on the contrary, an occurrence that is reasonably to be expected. Every instance of linguistic change, in the opinion of the Neolinguists, is originally a creation of one man, which is subsequently imitated, 'recreated' by others and in this way spreads over a more or less vast area. On this specific point the Neolinguists are undeniably superior to the Neogrammarians, who did not clearly distinguish between innovation, which never can be a collective phenomenon, and the spread of innovation, which is collective by definition. As far as the remaining crucial differences are concerned, both schools, neogrammarian and neolinguistic, have treated the problem of linguistic change in a rather simplistic way. The Neolinguists rejected categorically the family-tree model first proposed by August Schleicher (1821–68) in order to illustrate the differentiation of languages which are supposed to have a common origin. They opted instead for the so-called 'wave theory' introduced by Schleicher's pupil Johannes Schmidt (1843–1901) in order to explain the spread of innovations in a relatively homogeneous linguistic area. However, they were not willing to accept that both models are complementary rather than mutually exclusive; since they fit two opposite historical situations they cannot be globally accepted or rejected. Yet the most important distinction made by Bartoli himself between 'preethnic' innovations (i.e., innovations which precede the splitting-up of a homogeneous linguistic group) and 'postethnic' innovations (i.e., innovations which arise after the linguistic and, above all, geographical separation of the formerly homogeneous group and therefore cannot surmount easily the barriers between the fractions of the former group) shows clearly that both models are in fact valid, provided that they are applied to the corresponding historical situation (see Bartoli 1945: 1–31; Devoto 1947: 213). Similarly, the conclusions drawn by the Neolinguists from the old credo of the linguistic geographers according to which 'every word has its own history,' are a good example for the fact that not only the Neogrammarians but also the Neolinguists tended to make hypergeneralizations. From the fact that the regularity of sound change in a given dialect can be 'disturbed' by borrowing (besides countless 'regular' French forms like *chanter*, *chauve*, *échapper*, etc., there are a lot of 'borrowed' or 'learned' forms like *cantatrice*, *calvitie*, *rescapé*, which seem to call into question the validity of the formula: Latin *ca* → French *cha-*), it does not follow with logical necessity that every kind of linguistic change takes place in words and not in phonemes (Bonfante 1947: 355).

2.4 The Heart of the Neolinguistic Doctrine

The 'sound-laws' of the Neogrammarians have found their neolinguistic counterpart in the five 'areal norms' (*norme delle aree*) established by Bartoli as an instrument to discover the chronological relationship between two or more concurrent linguistic forms and to formulate reasonable hypotheses with regard to their origin and the reasons for their actual geographical distribution:

(a) the earlier stage is usually preserved in the more isolated of two areas;
(b) the stage attested in lateral areas is usually the earlier stage, provided the central area is not the more isolated one;
(c) the greater of two areas usually preserves the earlier stage, provided the lesser area is not the more isolated and does not consist of lateral areas;
(d) the earlier stage is usually found in an area occupied later by the people who speak the language in question;
(e) if one of the two stages is obsolete or about to disappear, it is usually the obsolete stage which will disappear first (see Bartoli 1925: 3–17; Bartoli & Bertoni 1925: 66–77; Hall 1946: 274; the expression 'marginal' used by Hall instead of 'lateral' is misleading, according to Bonfante 1947: 369).

Of these norms which should be considered not as necessary but as statistical laws—it should be noted that Bartoli never omits to supply counterexamples for each stage—the most important is the second one (b), namely, the one concerning the relationship between lateral and central areas, which represents, at the same time, an excellent illustration of a proper application of the 'wave-theory' (see above) in the field of linguistic dialectology. In the whole Latin-speaking area the Classical form *pulchrior* 'more beautiful' has been substituted by the more 'popular' form *magis formosus*, preserved in Spanish *mas hermoso*, Portuguese *mais formoso*, and in Romanian *mai frumos*. In the territory between these two areas, *magis formosus* has been in turn substituted by the new form *plus bellus* (French *plus beau*, Italian *più bello*) which did not reach points very distant from its center of irradiation.

3. Reception and Critique

The reception of the writings of the Neolinguists among their colleagues was anything but enthusiastic, apart from some Italian supporters of the movement. Even a scholar deeply rooted in the tradition of the Italian 'idealistic' language philosophy, Giovanni Nencioni (b.1911), criticizes rather sharply the eclectic character of Bertoni's language theory and his lack of information in the domain of general linguistics (Nencioni 1989: 5–21).

From the viewpoint of the modern sociolinguistic conception of a language as representing not a homogeneous system but an ensemble of co-occurring language varieties, the Neolinguists have been criticized for denying that two concurrent linguistic forms may be more or less coeval, belonging to different 'levels' or 'styles' of the same language (see Iordan & Orr 1970: 278). The word *bellus*, for instance, which supplanted *formosus* in the central area of the Roman Empire (see above), was also a Classical Latin word, but with a slightly different meaning, that is to say 'pretty' as against 'beautiful.' Since this form was probably employed mainly in informal situations, the substitution of *bellus* for *formosus* may be characterized as the generalization of a colloquial style at the expense of the formal one.

A number of critics, not without ironical undertones, have pointed to the fact that at least Bartoli, in the late phase of his life, became as rigid and schematic as the sharply criticized Neogrammarians. Seen from the distance of half a century, the differences between the two schools are becoming blurred: '[. . .] the neolinguistic doctrine is nothing more than a continuation of that of the Neogrammarians but with certain modifications introduced to bring it into line with modern tendencies, mainly geographical' (Iordan & Orr 1970: 278; Devoto 1947: 213–15).

However, the most important critique that can be brought against the Neolinguists consists in the reproach of having confused linguistics and language philosophy. Neolinguists had a subtle intuition about the 'essence' of human language, but they neglected those of its aspects which are really accessible to a scientific approach, i.e., its social and 'regular' or 'systematic' character. Philosophers ask what things 'really are,' scientists are interested in the manner in which they 'behave,' and therefore the latter are not concerned with 'real things' but only with 'reductive fallacies.' The Neogrammarians did not for the most part work on 'real' languages but on abstractions made for a specific purpose—the leading mind of the school, Hermann Paul (1846–1921), seems to have been fully aware of it—but they were, in the end, very successful in doing what they did. This explains why their influence on the ongoing development of linguistics has been more important than that of the Neolinguistic School.

Bibliography

Bartoli M 1910 Alle fonti del neolatino. In: *Miscellanea di studi in onare di Attilio Ortis*. Trieste
Bartoli M 1925 *Introduzione alla neolinguistica: Principi—scopi—metodi*. Olschki, Geneva
Bartoli M 1945 *Saggi di linguistica spaziale*. Vincenzo Bona, Turin
Bartoli M, Bertoni G 1925 *Brevario di neolinguistica.Part I: Principi generali di Giulio Bertoni. Part II: Criteri tecnici di Matteo Bartoli*. Società Tipografica Modenese, Modena
Battisti C (ed.) 1966 Orientamenti generali della linguistica in Italia. In: Mohrmann Ch, Sommerfelt A, Whatmough J (eds.) *Trends in European and American Linguistics 1930–60*. Spectrum, Utrecht
Bertoni G 1922 *Programma di filologia romanza come scienza idealistica*. Olschki, Geneva

Bonfante G 1947 The Neolinguistic position (A reply to Hall's criticism of Neolinguistics). *Language* **23**: 344–75

Bonfante G 1970 *La dottrina neolinguistica: Teoria e pratica*. Giapichelli, Turin

Christmann H H 1981 Idealism. In: Posner R, Green J N (eds.) *Trends in Romance Linguistics and Philology*, vol. 2. Mouton, The Hague

Devoto G 1947 Matteo Bartoli. *Word* **3(3)**: 208–16

Hall R A Jr 1946 Bartoli's 'Neolinguistica.' *Language* **22**: 273–83

Iordan I, Orr J 1970 *An Introduction to Romance Linguistics: Its Schools and Scholars*. Blackwell, Oxford

Malkiel Y 1954–55 Etymology and historical grammar. *Romance Philology* **8**: 187–208

Nencioni G 1989 *Idealismo e Realismo nella Scienza del Linguaggio*. Scuola Normale Superiore, Pisa

Prague School Phonology

J. M. Y. Simpson

The members of the Cercle Linguistique de Prague (founded in 1926), otherwise known as the 'Prague School,' had an admirably wide range of interest in matters linguistic. They included in their purview diachronic linguistics, language typology, the functions of language, morphology, stylistics, the meaning of grammatical categories, the teaching of languages, and the relationship between spoken and written language; their work in both syntax and semantics was pioneering (see *Prague School Syntax and Semantics*). Yet, unfairly, they are generally most celebrated for their contribution to phonology, the outstanding names being those of N. S. Trubetzkoy (1890–1938) and Roman Jakobson (1896–1982). Jakobson fled from the Nazis in 1939, settling in 1941 in the USA, where he continued to make authoritative and influential contributions not only to phonology but to a large number of other fields of language study, remaining pre-eminent in them until his death. Trubetzkoy, however, died at the comparatively young age of 48 and his work in areas other than phonology has been largely forgotten. The present article deals with the development of those characteristics for which Prague School phonology is best known.

1. Phonology and Phoneme

An international conference on phonology was held in December 1930 in Prague, the proceedings being published the following year as *Travaux du cercle linguistique de Prague* **IV**: *Réunion phonologique internationale tenue à Prague (18–21/XII 1930)*. One of the supplements to this volume was a *Projet de terminologie phonologique standardisée* ('Draft of a Standardized Phonological Terminology'). This set out in brief the early Prague School view of phonology and listed topics that came to be developed in the course of the decade. It was cast in the form of over sixty definitions of key terms. (There is not complete unanimity in the *Projet*: it incorporates observations, additions, and objections from various participants; these are ignored here).

'Phonology' is defined as that area of linguistics which deals with phonic phenomena from the point of view of their function. This function is that of distinguishing different words in a given language, marking 'intellectual' (i.e., semantic) differences (as opposed, e.g., to emotional or stylistic differences in pronunciations of the same word). Phonetics, on the other hand, is an ancillary discipline which is not concerned with meaning, but only with the investigation of speech-sounds from various points of view, e.g., physiological or acoustic. ('The distinction between the phonetic and the phonological examination of speech-sounds is fundamental and cannot be emphasized enough,' as Trubetzkoy (1929) put it.)

Differences of meaning are carried by 'phonological oppositions' in a given language and the sum total of such phonological oppositions is the 'phonological system' of that language. 'Phoneme' is defined as a phonological unit which cannot be split into smaller and simpler phonological units, in other words a phoneme is the smallest phonological unit. One example given of a phonemic opposition in French is that of the vowels in *dé* /de/ 'thimble' and *dais* /dɛ/ 'canopy.' These are clearly different words, therefore /e/ and /ɛ/ are different phonemes. (The employment of solidi and square brackets in this article to notate phonemes and realizations respectively is anachronistic, but useful.) The same two sounds appear in Czech but only as optional alternatives: they cannot distinguish words and are therefore not different phonemes.

This functional view of a phoneme, taking as a starting point the oppositions within a language, is at variance with the 'physical' view of a phoneme as being a family of sounds in a language, the view held by Daniel Jones and enunciated by him in a paper ('On Phonemes') published in the volume under discussion. It is also different from the 'psychological' view held by Baudouin de Courtenay (and at an early period by Trubetzkoy) that the phoneme is an ideal sound at which the speaker aims, and different from the approach of many American structuralists which excluded any consideration of meaning in the identification of phonemes. In part, this *Projet* was stimulated by an earlier proposal for a research plan in phonology made by Jakobson (Jakobson 1928); the latter had been one of the first attempts to classify different types of phonemic opposition.

2. Phonological Systems

Relations among phonological units are also discussed. 'Correlation' is the opposition between the presence or absence of 'a certain phonic feature' which distinguishes several pairs of phonemes in a given language. In Latin, for example, long vowels are phonemically opposed to short vowels; length is here the relevant 'phonic feature' the presence or absence of which distinguishes between the vowels in each pair, and as such is defined as the 'correlation marker.' This type of factor permits the recognition of a structure or patterning within phonemic systems. The 10 Latin vowels /a aː o oː e eː u uː i iː/ are not seen as 10 random unrelated items. On the contrary, they form a system consisting of five 'correlative pairs,' each consisting of two 'correlative phonological units.' Furthermore all five long vowels can be regarded as forming one 'correlative series,' and all five short vowels another. (The recognition of correlation had been one of the contributions to phonology made in Jakobson (1928) where he labeled any opposition which was not a correlation a 'disjunction.').

Phonemes which are characterized by the presence of the relevant phonic feature are regarded as 'marked' (e.g., the Latin long vowels); those characterized by its absence are 'unmarked' (e.g., the Latin short vowels). ('Markedness' was soon to be recognized as an important concept, not only in phonology but in other areas of linguistic investigation.

The term 'archiphoneme' was introduced to mean the element common to two or more correlative phonemes: Latin /a/ and /aː/ have place of articulation in common and differ only in length. They therefore form an archiphoneme. Similarly, Russian /t t^j d d^j/ differ only in the features of voice and of palatalization; their place of articulation is regarded as being the same, therefore these four phonemes form an archiphoneme. The archiphonemes in a language, together with any phonemes which do not have correlative partners (such as English /l/), form the system of 'fundamental archiphonemes' of that language. (The word 'archiphoneme' came to be used in a slightly different way in Trubetzkoy (1939); see Sect. 6 below.)

Various types of correlation are enumerated: palatalization versus nonpalatalization, lip-rounding versus lip-spreading, voice versus voicelessness, nasalization versus nonnasalization, and so on.

An attempt is made to establish a typology of vowel systems. There are systems where only one dimension, namely degree of openness, need be taken into account. These are 'linear systems'; the vowels of Adyghe are an example (see Fig. 1).

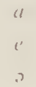


Figure 1. Adyghe vowel system

More complex systems require the recognition of two dimensions, frontness versus backness in addition to openness, as in the Latin system displayed in Fig. 2. In this, the phoneme with the greatest degree of openness /a/ is not characterized by either frontness or backness, its only relevant component is in fact openness; the vowels may therefore be arranged in a triangle. Although rounding is a phonetic feature of /o/ and /u/, it is not distinctive phonologically and is therefore not taken into account.

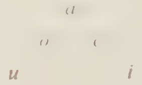


Figure 2. Latin vowel system

Systems in which the greatest degree of openness preserves the distinction between back and front vowels may be arranged in rectangles, as in the system of literary Slovak shown in Fig. 3.

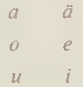


Figure 3. Literary Slovak vowel system

Such visual displays are successful only where two dimensions are involved. Vowel systems such as that of Turkish where rounding is an independent (and hence relevant) feature would require a three-dimensional display; that given later in Trubetzkoy (1939) obscures this independence. The problem becomes increasingly great if even more independent relevant features have to be taken into account.

3. Nondistinctive and Distinctive Variations

Nonphonological variations are those which are the necessary consequence of phonological oppositions. For example, in Russian there is opposition between stressed and unstressed vowels, but any difference in length or in pitch in the realization of these vowels is due to the difference of stressing and is nondistinctive. Similarly, variations in the quality of Russian vowel phonemes, depending on whether or not they are adjacent to palatalized or nonpalatalized consonants, are nonphonological.

There might seem to be a contradiction between the definition of a phoneme as being a unit that cannot be split into smaller phonological units, and the recognition of ‘phonic features’ that in fact appear to be just such smaller phonological units. What was meant was that the sound realizing a phoneme cannot be further divided as a linear sequence, but it can nevertheless by analyzed into simultaneously occurring relevant components. Trubetzkoy had earlier drawn attention to the absence or presence of voice as distinguishing pairs of German plosives, e.g., in the words *Keil* ‘wedge,’ *geil* ‘lascivious,’ *Pein* ‘torment,’ *Bein* ‘leg.’ He goes on, ‘In one's language-consciousness there exists the equation ‘k : g = p : b’ and by this very fact each element of the equation can be split into elements phonologically.’ In the phoneme /k/, he claims, there are two muscular-acoustic components in the apprehension of sound: velar plosion and voicelessness (Trubetzkoy 1929).

Such simultaneously occurring phonological components became known as ‘distinctive features’; the idea that not only phonemes were in opposition but also components of phonemes was a crucial ingredient in Trubetzkoy's approach to phonology, at least from 1929 onwards. (Jakobson was later closely associated with a far-reaching development of distinctive features in generative phonology in the 1950s and 1960s.)

The result was that phonemes came to be regarded as being composed of a number of phonologically significant ‘distinctive features,’ for example, voice, aspiration, nasality, and place of articulation. Each distinctive feature is seen as standing in opposition to its absence, or to the presence of another distinctive feature, in at least one other phoneme in the language. To take an example from English, /b/ possesses the distinctive feature of voice as opposed to the absence of voice in /p/; /b/ also possesses the distinctive feature of bilabiality as opposed to velarity in /g/. Phonemes can of course have distinctive features in common: both /p/ and /b/ share the distinctive feature of bilabiality.

Phonemes are therefore viewed as having similarities as well as differences, and so they can be grouped. For example, in English /p/, /t/, and /k/ differ in place of articulation, but they share lack of voice and lack of nasality.

Differences between realizations of each phoneme are ignored as being nondistinctive; in the case of English /t/, for example, it is not important from the point of view of phonology that the actual sounds are variously dental or alveolar or postalveolar, aspirated or unaspirated, lip-rounded or lip-spread. Even though the place of articulation is distinctive, dental, alveolar, and postalveolar articulations are subsumed as ‘the same’ place of articulation which can be called ‘front.’ ‘Frontness’ is distinctive because it is neither bilabiality nor velarity, which characterize /p/ and /k/ respectively.

4. The Nature of Phonemic Systems

As a result, the phonemic system of a language was seen to be not a random list but a structure characterized by internal cohesion, certain pairs or groups of phonemes possessing a closer relationship to each other than to phonemes which did not belong to the pair or group. These phonemes could be displayed in patterns that show such relationships. Although there seemed to be a greater interest in displaying patterns of vowels (as has been illustrated above), relationships between consonants may also be brought out in this way, as in Trubetzkoy (1931). English plosives and nasals can be arranged as in Fig. 4. It is noteworthy that these patterns often prove to be symmetrical, as this is.

Trubetzkoy (1931) gives an abbreviated example of a Sanskrit system of plosives. It can be completed and extended to include nasals, as in Fig. 5.

Articulatory features had long been used in phonetics in the description of speech-sounds. The advance made by the Prague School was in applying such a technique to phonology, necessarily entailing idealization or abstraction. One advantage was that not only were relationships between phonemes revealed, but the number of basic phonological elements was reduced. It is striking that while in the above selection from the sound-system of Sanskrit there are 25 phonemes, only eight distinctive features

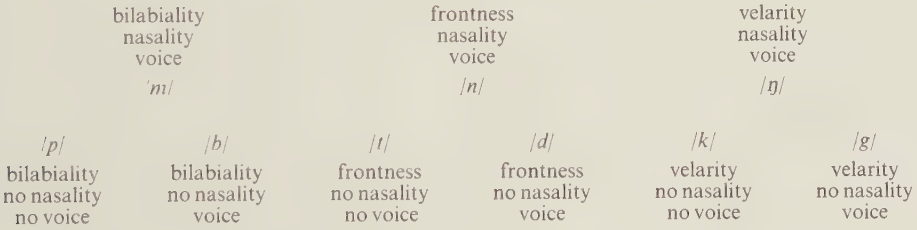


Figure 4. English plosive and nasal system

p ph	*t th*	*c ch*	*ʈ ʈh*	*k kh*
b bɦ	*d dɦ*	*ɟ ɟɦ*	*ɖ ɖɦ*	*g gɦ*
m	*n*	*ɲ*	*ɳ*	*ŋ*

Figure 5. Sanskrit plosive and nasal system

are necessary for their description (bilabiality, dentality, palatality, retroflexion, velarity, voice, aspiration, and nasality).

It should be pointed out that not all systems are completely symmetrical. Systems occur where the symmetry is marred by gaps. Trubetzkoy (1939) draws attention to the fact that some Arabic consonants fall into pairs, one member of which is emphatic (which he equates with 'velarized') and the other nonemphatic. However, not every nonemphatic consonant has an emphatic correlate.

5. *Grundzüge der Phonologie*: Phonemes and Oppositions

During the 1930s Trubetzkoy and Jakobson developed their conception of phonological systems. In 1935 Trubetzkoy published his *Anleitung zu phonologischen Beschreibungen* ('Introduction to Phonological Descriptions') which reiterated his distinction between phonetics and phonology. The former dealt with the description of physical phenomena with no regard for their function, the latter attempted to interpret these phenomena in terms of their language-bearing capabilities. Trubetzkoy set out to enable scholars to produce descriptions of the phonological systems of the languages on which they were conducting research, in contrast to the many previous studies of languages made by phoneticians, primarily interested in the articulatory or instrumental description of speech-sounds.

The material of the *Anleitung* was incorporated into the great work which was to be the summing up of his approach to phonology and which may be seen as *the* classic statement of Prague School phonology, his *Grundzüge der Phonologie* ('Principles of Phonology'), published posthumously in 1939. In it most of the topics dealt with above are expanded and examined in greater depth; in particular much space is devoted to elaborating a typology of vowel systems. Copious examples from natural languages are adduced, the number of languages or language groups cited in the index being 218.

Trubetzkoy adopts the position of the *Projet de terminologie phonologique standardisée* of 1931 that the basis for phonological opposition is the distinction of 'intellectual' meanings. For example, the final consonants of *pat* and *pad* are distinct phonemes in opposition to one another since they serve to distinguish two words; in consequence the opposition of voice versus voicelessness is distinctive in English. On the other hand, while there may be a difference in phonetic quality in some English-speakers' pronunciation of the respective laterals in *peel* and *leap* (velarization versus nonvelarization), it cannot be the basis for any phonological opposition in English: since velarization in such speakers occurs syllable-finally and nonvelarization syllable-initially, velarization can never be contrasted with nonvelarization; in consequence the difference is non-distinctive in English (though it may be distinctive in other languages).

Sounds such as the velarized lateral in *peel* and the nonvelarized lateral in *leap* can never occur in the same phonetic environment in English; such sounds are termed 'nonpermutable.' These particular two sounds differ only in their phonologically nonrelevant characteristics, are members of the same phoneme, and are termed 'variants' of that phoneme. Other sounds, such as the /t/ of *pat* and the /d/ of *pad* are termed 'permutable' since they can occur in the same phonetic environment. Not all permutable sounds, however, need carry distinctive contrasts. For example, the same speaker of English may pronounce the ⟨r⟩ in *tree* as a tap on one occasion and as a fricative on another, but no difference in meaning is involved, hence the sounds are variants of the phoneme /r/.

Trubetzkoy gives the following rules for the identification of phonemes in a language and the assigning of variants to phonemes.

Rule 1: Sounds which are permutable and which can be interchanged without making any difference to the meaning of the word are termed 'optional' variants of one phoneme; examples are the variants of /r/ mentioned above. These correspond to the 'free variants' of American phonemic phonology.

Rule 2: Two sounds which are permutable but which cannot be interchanged without changing the meaning of the words involved (or resulting in something unrecognizable) must be realizations of different phonemes; examples are the /t/ and /d/ of *pat* and *pad*.

Rule 3: Two sounds which are nonpermutable (i.e., which do not occur in the same phonetic environment) and are similar in articulatory or acoustic characteristics are 'combinatory variants' of the same phoneme; examples are the velarized and nonvelarized realizations of /l/ in *peel* and *leap*, which are similar in articulatory terms in that each is a voiced alveolar lateral. These corresponded to the 'allophones' of American phonemic phonology. (In contradistinction, although the initial sound and final sound of *hang* are not permutable, they cannot be considered as variants of the same phoneme for, apart from being produced on a pulmonic egressive airstream mechanism, they have nothing in common, the first being a voiceless vocoid, the second a voiced velar nasal.)

Rule 4: Although two sounds may satisfy the conditions of Rule 3, they cannot be reckoned to be variants of the same phoneme if they can occur in sequence in a position where one of them may occur alone. Trubetzkoy's example is taken from a particular pronunciation of English (presumably Received Pronunciation) where /r/ is realized without friction (i.e., as an approximant) and thus is articulatorily similar to /ə/. Moreover, this pronunciation of English is nonrhotic, i.e., /r/ cannot occur before a consonant and since /ə/ cannot occur before a vowel, the two sounds are nonpermutable. Trubetzkoy avoids having to regard them as variants of the same phoneme by citing the words *profession* /prəˈfɛʃn̩/ (where they occur in sequence) and *perfection* /pəˈfɛkʃn̩/ where one of them occurs alone.

Trubetzkoy goes on to develop a classification of the oppositions that may be found in systems of phonemes, the basis of comparison being the shared features of two phonemes in opposition.

One dimension of this classification is a distinction between 'bilateral' and 'multilateral' oppositions. 'Bilateral oppositions' involve only two terms which share a combination of features that is found in no other phoneme: an example is /t/ and /d/ in German or English, since these are the only two alveolar plosives in these languages. Multilateral are any other oppositions. Bilaterally related phonemes can be held to impart a greater cohesion to the phonemic system than multilateral ones. In any system, the number of multilateral oppositions is greater than that of bilateral ones. Multilateral oppositions are further divided into 'homogeneous; and 'heterogeneous.' Homogeneous multilateral oppositions may be regarded as linked by a chain of bilateral oppositions, e.g., /x/–/ŋ/ in German, for the phonemes in question can be linked by the oppositions /x/–/k/, /k/–/g/, /g/–/ŋ/. On the other hand, /p/–/l/ cannot be so linked and the relationship is termed a heterogeneous multilateral opposition.

A second dimension of classification is that between 'proportional' and 'isolated' oppositions. An opposition is proportional if it is mirrored by an identical opposition between at least one other pair of phonemes. Thus the opposition of /p/–/b/ in German is proportional for it is mirrored by the oppositions /t/–/d/ and /k/–/g/. The relationship between /p/ and /ʃ/, however, is isolated, for there is no other pair related in the same way.

A third dimension of classification is provided by the nature of the distinctive features of the phonemes in opposition. In a 'privative' opposition one of the pair lacks a feature by which the other is 'marked', thus in English /p/ lacks the marked feature of voice which distinguishes /b/. In a 'gradual' opposition the terms are marked by different degrees of the same characteristic, thus the vowels /i/–/e/–/a/ are on a continuum of tongue height. All other oppositions are 'equipollent': the terms involved cannot be regarded as differentiated either by the presence or absence of a feature or by different degrees of the same characteristic, e.g., /f/–/k/ in German. Such oppositions are the most numerous in any system.

6. *Grundzüge der Phonologie*: Neutralization and Archiphoneme

An important development, based on Trubetzkoy (1936), is presented in the *Grundzüge*. This takes over the term 'archiphoneme' and uses it in a slightly more sophisticated way. The type of analysis in terms of distinctive features uncovers further complexity in the interrelationship of phonological system and permitted linear sequences of phonemes: phonological units are seen to enter into different oppositions at different positions in structures. For example, in French the sounds [e] and [ɛ] can be realizations of two different phonemes, /e/ and /ɛ/, as in *allez!* /ale/ 'go!' versus *allait* /alɛ/ 'was going.' However, these contrast only in a final open syllable. Elsewhere the appearance of one sound rather than the other is mechanical, [e] appearing in an open syllable, [ɛ] in a closed, as in *espérer* [ɛspere] 'to hope.' Where no contrast is possible, the opposition is said to be 'neutralized' and the sound that occurs in such a position is said to be a member of an 'archiphoneme.' A convention has arisen of using upper-case letters as a notation for archiphonemes; *espérer* would therefore be analyzed phonologically as /EspEre/.

Four different types of relationship between the sounds realizing the archiphoneme and the sounds realizing the corresponding phonemes in opposition are noted. First, the sound realizing the archiphoneme is not a sound that realizes either of the contrasting phonemes. In English, /p/ and /b/ are in opposition in word-initial position as in *pat* and *bat*, respectively /pat/ and /bat/. However, the opposition is neutralized after /s/, as in *spat* /sPat/; here /P/ is realized by an unaspirated voiceless plosive, which is neither the aspirated voiceless plosive typically used to realize /p/, nor the unaspirated voiced plosive typically used to realize /b/. Second, the sound representing the archiphoneme is identical to the realization of one of the phonemes in opposition, the choice between them depending on the quality of an adjacent phoneme. In Dutch, /f/ and /v/ are in opposition word-initially (*firma* 'firm,' *vier* 'four') but the opposition is neutralized before a plosive; the sound realizing the archiphoneme /F/ then has the same voicing as the plosive: *afkeuren* [ˈɑfkøːrə] 'to disapprove of,' *afbellen* [ˈɑvbɛlə] 'to ring off.' Third, the choice of realization is made without reference to adjacent phonemes, what he calls 'internally conditioned neutralization.' In the case of 'privative' oppositions (i.e., oppositions between an unmarked member and a marked member of a pair), the choice is that of the unmarked member, thus in German /t/ and /d/ are in opposition intervocalically (*Rates* 'of advice,' *Rades* 'of wheel') but word-finally [t] is the realization of /T/ (*Rat* 'advice,' *Rad* 'wheel,' both [raːt]). Fourth, the archiphoneme may be realized by two different sounds, depending on the position in the word. In German, /z/ and /s/ are in opposition intervocalically (*reisen* /ˈraɪzən/ 'to travel,' *reißen*

/'raɪsən/ 'to tear') but not word-initially or word-finally; word-initially the archiphoneme /S/ is realized by [z] as in *sang* 'sang' but word-finally by [s] as in *Fuß* 'foot.'

One implication of Trubetzkoy's reasoning is that rather than postulate one phonological system in the analysis of a language, it might be less misleading to draw from a series of systems composed of phonemes in opposition and archiphonemes in opposition, each system being appropriate to a given point in linear structure. This line of thought, undermining the notion of one phonemic system, destroys confidence in the notion of the phoneme itself. This type of argument was raised against the phoneme by J. R. Firth and his colleagues of the 'London School'.

7. *Grundzüge der Phonologie:* Boundary Signals

In view of the last observation, it is instructive to note that Trubetzkoy devotes a section of the *Grundzüge* to 'boundary signals' that mark various kinds of linear structure: for example, in German /h/ always marks the beginning of a morpheme or word. This type of phenomenon was a particular interest of the London School. Clearly, both the Prague School and the London School were aware of the importance of the syntagmatic axis in phonology and its relevance to grammar, and each advanced different methods of solving the associated problems.

Trubetzkoy recognises various classes of such boundary signals. For example, in the Scottish Gaelic of the island of Barra, nasalized vowels are phonemes which stand in opposition to oral vowels and so can be used to distinguish different words. Yet at the same time these nasalized vowels also act as boundary signals delimiting stretches of utterance, for they appear only in initial syllables. Similarly, in Ancient Greek /h/ was both a phoneme and a marker indicating the beginning of a word. These are examples of 'phonemic boundary signals.' On the other hand, certain combinatory variants (which of course cannot distinguish words) can also act as boundary markers. These are 'nonphonemic boundary signals.' Thus in Tamil the presence of aspirated voiceless plosives indicates the beginning of a word since they appear only in that position; word-internally the corresponding member of the phoneme is a voiced plosive or a fricative.

Boundary signals of the above types may be called 'individual boundary signals' since only one phoneme or combinatory variant is involved in each case. In contrast Trubetzkoy recognises 'group boundary signals' consisting of sequences of phonemes in which the first marks the end of some significant unit (morpheme or word) and the second the beginning of another unit. Examples of these are remarkably varied and numerous. Among others Trubetzkoy cites the sequences /θs/ and /zð/ in English as in *tenths* (morpheme boundary) and *as though* (word boundary).

Boundary signals such as the above may be termed 'positive boundary signals' for they actively indicate the beginning or end of some unit. 'Negative boundary signals' on the other hand indicate that either the beginning or the end cannot possibly occur at that point. For example, in English /h/ indicates that the end of a word cannot occur at that point, while /ŋ/ indicates that the beginning of a word cannot occur at that point.

8. The Notion of Function

The type of phonology presented in the *Grundzüge*, and indeed Prague School phonology as a whole (as is indicated in embryo in the *Projet* of 1931), may be described as 'functional' since phonic elements are studied from the point of view of the various functions they fulfil in a particular language.

In the Introduction to Trubetzkoy (1939) the work of the Austrian psychologist and linguist Karl Bühler (1879–1963) is cited with approval, in particular Bühler (1934), as being applicable to the study of phonology. Bühler proposes that the existence of a speaker implies both the existence of a hearer and of a state of affairs about which the speaker speaks. There are thus three aspects to a speech situation and accordingly three different situational functions may be recognized.

The speaker reveals some information about herself or himself, thus fulfilling the 'expressive' function. Some of this information, such as the revelation of one's sex or age, may have nothing to do with phonology for there is no choice, and hence no conventional system of signs, involved. But certain phonological choices may be made in accordance with a system which reveals something of the speaker. For example, it is reported that among speakers of Yukaghir certain sounds are pronounced by adult males as palatal plosives and by marriageable females as affricates. In Tamil certain phonemes are pronounced differently by members of different castes. In European languages social status or geographical provenance may be betrayed by phonological choices. Such choices indicate membership of a particular group.

However, the speaker may also wish to arouse certain feelings in the listener, thus fulfilling the 'appeal' (or 'appellative') function. Here again choices may help to achieve this goal, as in the lengthening of consonants and/or vowels (as in the German exclamation *schschöön*! or English *beauuuuuuutiful*!) to excite enthusiasm, for example. (It may be debated whether this particular choice distinguishes 'intellectual' meanings.)

In speaking about a given state of affairs the speaker fulfils the 'representative' function. Accordingly representative phonology deals with a vast area while the previous two functions are concerned with only a restricted group of facts.

Trubetzkoy recognises further functions which may be regarded as intralinguistic. By far the most important is the 'distinctive' function carried out by phonemes and distinctive features and serving to differentiate units of meaning, as has been explained above. The 'culminative' function enables the listener to split an utterance into a group of words; in languages in which each word is marked by one stressed syllable, the number of stresses corresponds to the number of words. The 'delimitative' function is carried out by the boundary signals mentioned above which mark the limits of words or morphemes.

9. Envoi

While the above are the most celebrated aspects of the *Grundzüge*, they are by no means the sole concerns of this immensely rich book. Other topics dealt with include the statistical investigation of the occurrence of types of phoneme and their functional load, morphophonology, phonology and historical geography, and (in appendices by Roman Jakobson) principles of historical phonology, phonological affinities between languages, and the phonology of child language and its place within general phonology.

Bibliography

Bühler K 1934 *Sprachtheorie: Die Darstellungsfunktion der Sprache*. Fischer, Stuttgart (Transl. by Goodwin D F 1990 as *Theory of Language: The Representational Function of Language*. Benjamins, Amsterdam)

Jakobson R 1928 Proposition au premier congrès international de linguistes. Quelles sont les méthodes les mieux appropriées à un exposé complet et pratique de la phonologie d'une langue quelquonque? *Actes du 1er Congrès International de Linguistes*. Repr. in Jakobson R 1962

Jakobson R 1962 *Selected Writings Vol. 1: Phonological Studies*. Mouton, The Hague

Travaux du Cercle Linguistique de Prague **IV**: *Réunion phonologique tenue à Prague (18–21 XII 1930)* 1931, Jednota Československých Matematiků a Fysiků, Prague

Trubetzkoy N S 1929 Zur allgemeinen Theorie der phonologischen Vokalsysteme. In: *Travaux du Cercle Linguistique de Prague* **I**: 39–67. Repr. in Vachek J (ed.) 1964

Trubetzkoy N S 1931 Die phonologischen Systeme. In: *Travaux du Cercle Linguistique de Prague* **IV**: 96–116

Trubetzkoy N S 1935 *Anleitung zu phonologischen Beschreibungen*. Association internationale pour les études phonologiques (édition du Cercle linguistique de Prague), Brno

Trubetzkoy N S 1936 Die Aufhebung der phonologischen Gegensätze. In: *Travaux du Cercle Linguistique de Prague* **VI**: 29–45. Repr. in Vachek J (ed.) 1964

Trubetzkoy N S 1939 *Grundzüge der Phonologie*. (*Travaux du Cercle Linguistique de Prague* **VII**) (Transl. Baltaxe, CAM 1969 as *Principles of Phonology*, University of California Press, Berkeley, California)

Vachek J (ed.) 1964 *A Prague School Reader in Linguistics*. Indiana University Press, Bloomington, Indiana

Vachek J 1966 *The Linguistic School of Prague*. Indiana University Press, Bloomington, Indiana

---

Prague School Syntax and Semantics

Eva Hajičová

The Prague School of Linguistics, though better known for its research into the domain of phonology, has brought many valuable insights into syntax and semantics as well, especially with its due regard to the character of language as a system of signs (with its specific relation between grammar and semantics) and to the communicative function of language. In formulating these issues as early as the 1930s, the Prague School was well ahead of most of the linguistic trends in the USA (where meaning was excluded from linguistic research for a long time) and in Europe (where, in fact, it had such important adherents as Lucien Tesnière). Even in the early 1990s, the elegance and economical character of dependency syntax, for which formal frameworks were formulated (both for generation and for parsing) in Prague, represents a challenge for the main approaches to theoretical linguistics.

1. The Main Roots of Prague School Syntax and Semantics

1.1 *Sentence and Utterance*

The distinction made between 'sentence,' as a unit of the language system and 'utterance event,' as a unit of discourse, or a verbal 'communicate,' can be traced back to Karcevskij (1931, 1937), with whom 'proposition' denotes a predicative syntagm, while 'phrase' refers to a function of dialogue having two sides: from the point of view of the conceptual layer, 'phrase' is a communicative unit, while from that of the phonic layer, it is an intonational unit.

Closely connected with this issue is the notion of 'sentence pattern' as introduced by Vladimír Skalička (1935, *Satzcliché*) and characterized by him as a sentence structure that is 'normalized' for some language or some part of the sentences of a certain language.

Vilém Mathesius (1936) regards 'sentence' as an abstract pattern that belongs to the field of language and sees the task of functional syntax as consisting in a systematic analysis of the repertoire of sentence patterns.

A systematic investigation into the dichotomy of sentence and utterance was carried out by Dokulil & Daneš (1958), who characterize 'utterance' as the smallest situationally anchored linguistic communication unit and 'sentence' as a typicized, common grammatical form of utterance.

1.2 Linguistic Meaning and Extralinguistic Content

The functional orientation of the Prague School (often characterized as a 'means–ends' model, especially by R. Jakobson) involves a view of language as a system of means expressing the (ontological, cognitive) content. Following F. de Saussure, the Praguians distinguished between content itself (or its different nonlinguistic patternings) and its (linguistically patterned) form, which was called (linguistic, literal) 'meaning'; a similar dichotomy is known from Louis Hjelmslev, and also from Eugenio Coseriu. The relationship between meaning and the outer (phonic or written) shape of linguistic units was regarded as the proper object of 'functional grammar' by Mathesius. This relationship between the two aspects of the linguistic sign was viewed as articulated into several levels of language system, every two adjacent levels being connected by the relation of form (signifying) and function (signified). As for sentence structure, Dokulil & Daneš (1958) showed persuasively that along with the grammatical patterning of the sentence (which later was called its 'surface structure') there exists a fully organized layer of meaning (understood as 'the content in its mirroring by the form'), which should be studied on the basis of grammatical form and consequently distinguished both from content and from form; this level corresponds to what later was distinguished in different linguistic models as the level of underlying or deep, tectogrammatical structure.

1.3 The Verb as the Center of Sentence Structure

Mathesius (1936) distinguished two processes involved in every communicative act of speech: (a) a selection of elements from reality that are expressed by means of the vocabulary existing in the given language (the study of which is the matter of functional onomatology), and (b) bringing the naming units into mutual relations so as to constitute an organic whole (studied by functional syntax). The central role in the organization of this organic whole is the predicate (cf. Thèses 1929: 13, on the study of predicational forms). The starting point for the study of the verb from a syntactico–semantic point of view was presented by Pauliny (1943), whose approach in certain aspects continued Jakobson's (1936) analysis of the meaning of cases. He distinguished several basic types of verbal 'intention' in accordance with the 'roles' semantically patterned with a verb and grammatically shaped, while others are only implicitly present (coalescing with the meaning of the verb, or with another role).

The main contributions to the general questions of verbal valency were formulated by members of the Prague School outside the country of its origin (first of all by Tesnière 1959 with his elaborate system of '*actants*' and '*circonstants*' and consistent distinction between two levels of sentence patterns; cf. also Kuryłowicz's (1949) syntactically based analysis of the functions of cases; these were two of the sources of Fillmore's case grammar), or outside the Prague Circle for Czech (Šmilauer 1947).

1.4 Functional Sentence Analysis

One of the basic aspects of Prague functionalism is the treatment of language as a functioning system, adapted to its communicative role. If a linguistic description is to be well integrated into a complex account of communication, due regard is to be paid to those features of sentence structure which reflect the impact of the communicative function of language. One of these features is functional sentence perspective (or topic and comment, theme and rheme, topic and focus). The importance of the phenomena now subsumed under the above-mentioned headings was well known since H. Weil, G. von der Gabelentz, P. Wegener, H. Ammann, and A. Marty. It was Mathesius who introduced these notions into the Prague School and anchored them in a systematic linguistic study. He pointed out various interrelations of the topic/focus articulation (TFA) with the grammatical sentence structure (e.g., the topic is characterized—in the Prague terminology of function and form, see Sect. 1.2 above—as one of the functions of subject; see especially Mathesius 1929) as well as its bearing on word order. One of the main results of this analysis (Mathesius 1928) was the confrontation of Czech and English in this respect: in Czech, TFA is the prevailing factor determining word order; in English, word order is determined mainly by the grammatical factor. If the actor belongs to the focus of a sentence and the goal belongs to its topic, the unmarked order is goal–verb–actor which, in English, is only made possible by the passive form of the verb (e.g., 'Shane was killed by Kim.') The order topic–focus is the natural order, called 'objective' by Mathesius, as opposed to the order focus–topic, which in Czech is 'subjective,' emphatic.

As will be seen in Sect. 4 below, the issues of topic and focus, in their interrelations with syntax and semantics, were widely discussed and the theory of TFA was further developed by the next generations of Czech linguists.

1.5 Other Work

This brief outline has to leave aside many important contributions concerning syntax and semantics in connection with stylistics, with the functional and social stratification of the national language, or with the development of individual languages, and so on. The writings of such prominent scholars as Trubetzkoy, Trnka, Vachek, and others here deserve the reader's attention (see especially Vachek 1964).

2. The Sentence Patterns Model

The sentence patterns model in syntax as developed by Daneš and his followers (Daneš 1968, 1987; Daneš et al. 1981) is based on the following two main assumptions:

(a) a distinction is made between three levels of sentence analysis: the level of (formal) grammatical structure, the level of semantic sentence structure, and the level of the communicative organization of the utterance (Daneš 1964); and
(b) the construction of a sentence is based on predication.

Two types of sentence patterns are distinguished: a formal grammatical sentence pattern and a semantic ('propositional') sentence pattern. The structure of the sentence can be described by a complex sentence pattern, which is a correlation of patterns of the two types. Thus, e.g., the structure of the English sentence 'Mary cleaned the cloth' can be described by a complex sentence pattern N/Agent ← VF/Action → N/Patient. Each grammatical sentence pattern can be viewed as a generalization over a class of verbs with identical valency; it contains a number of functional positions, which are filled in a particular sentence with particular lexical items. The number of these positions, as well as their syntactically bound morphological characteristics, is determined by the valency potential of the finite verb, which acts as the organizational center of the sentence structure both on the grammatical and on the semantic level. On the semantic level, the (meaning of the) finite verb determines the number and type of roles of the participants involved; the choice of particular participants is influenced by the semantic selectional restrictions associated with the meaning of the given verb.

The correlation of grammatical and semantic sentence patterns is not biunique; grammatical sentence patterns may exhibit both polysemy (a single grammatical sentence pattern may correspond to two or more semantic sentence patterns) and synonymy (two or more grammatical sentence patterns correspond to a single semantic sentence pattern).

Semantic sentence patterns are supposed to be language specific and to belong to the domain of linguistic meaning in the sense of the meaning/content distinction mentioned in Sect. 1.2 above. A description of the content structure of the sentence is aimed at by semantic formulas. Daneš's (1987) example of the following three sentences (1–3) illustrates the distinction between the two layers:

English: *Peter stole a book from his brother.* (1)
German: *Peter stahl ein Buch seinem Bruder.* (2)
Russian: *Petr ukral knigu u svojego brata.* (3)

The common semantic formula describing the given situation is A ((z LC y) T (z LC x)), containing the relators A for action, LC for local co-occurrence, and T for transitional change, and three components x for agent, y for the initial holder, and z for the held thing. The semantic formula has a hierarchical structure relating the agentive and the action–contents components on the highest level, the two situation components are related on the next lower level and these situation components themselves represent the lowest level in the hierarchy. This underlying semantic formula is reflected in different language specific semantic sentence patterns, where the initial holder is structured as the source of acquisition (in English), as the deprivation (in German), or as the location of acquisition (in Russian).

The relation between semantic formulas and the corresponding grammatical sentence patterns can be used to illustrate different perspectives in which a given action can be presented or a different hierarchization of participants of one and the same event: both 'She cleaned the cloth' and 'She cleaned the stain' correspond to the same semantic formula, namely x A ((y LC z) T (y LC z)), where LC denotes the relator of 'local co-occurrence,' the two occurring items y and z being 'a container' and its 'contents,' respectively, and the final situation is a negation of the one before the transition T. In the first of the two sentences, the given action is presented from the point of view of the participant 'container' (with the right-hand valency position of Direct Object being filled with the name of this participant), while the second sentence presents the action from the point of view of the participant 'contents'; in both cases, the given participant acquires the meaning of patient. Predicate structures are classified into two major classes, namely static predicates and dynamic predicates; the latter class is in turn subdivided into simple processes ('She is dancing.' 'It rained.') and mutations ('They are building a new house.' 'He marched the soldiers.')

Daneš's conception has found several followers especially among the Czech linguists studying Russian syntax and it represents one of the important stages in the development of valency theory. It also supplies many valuable stimuli for a many-sided classification of the lexical meanings of verbs.

3. Valency in the Prague Generative Approach

Prague School principles deeply influenced also the main tenets of the functional generative description (FGD) as proposed by P. Sgall in the early 1960s (Sgall 1964; for a more recent formulation, see Sgall, et al. 1986). FGD is conceived as a multilevel type of description (see Sect. 1.2), with a generative component enumerating the representations of meanings of sentences (tectogrammatical representations, TRs), which basically have the shape of dependency trees defined in such a way that the number of sister nodes is not limited; the root of the tree is the verb. A more complex form of the framework accounts also for coordination and apposition, which are relations of another kind than dependency. The TRs contain nodes with complex labels which include terminal symbols only; in these nodes all the information needed for the derivation of the surface shapes of sentences as well as that relevant for semantic interpretation is present. The dependency relation between the verb as the root of the tree and its immediate dependents is divided into different valency relations (see Sect. 1.3); the same holds true for the relations between nouns (adjectives, adverbs, embedded verbs) and their immediate dependents. The necessity of operational criteria for the specification of the linguistically patterned oppositions on the level of meaning has always been recognized in Prague, and is especially stressed in FGD.

The valency slots are classified into two types (see Panevová 1974, 1977; Hajičová & Panevová 1984): inner participants (cases) and free (adverbial) modifications. They can be operationally distinguished on the basis of two criteria: (a) Do the rules of the language described allow the occurrence of the given modification with every verb? (b) Can the modification occur more than once as a dependent of a single verb token? These two criteria classify the two surface objects as inner participants; with Actor, the answer to (a) might seem to be positive, but there are also impersonal (subjectless) verbs in inflectional languages (Latin *pluit*, *piget*) and the English surface subject in 'it rains,' 'it is snowing,' etc. appears to have no counterpart in the meaning of the sentence. This, as well as the negative answer to (b), corroborates the view that Actor should be classed as one of the inner participants. The adverbials of origin and of effect are similar to direct and indirect objects in that they are connected with a negative answer to (a) as well as to (b); their tectogrammatical counterparts thus are considered as inner participants. The outcome is five inner participants to be distinguished:

(a) Actor or Actor/Bearer (corresponding also to the cognitive role of Experiencer, and primarily expressed as a surface subject);
(b) Patient (Objective), as the primary underlying counterpart of the direct complement; cognitively it is the goal, the object affected by the action; 'cook potatoes,' 'touch the wires,' 'speak about the holiday';
(c) Addressee (known from traditional syntax under the heading of indirect object); 'tell someone,' 'bring something to someone,' 'pay somebody';
(d) Origin; 'build something from something,' 'change something from something';
(e) Effected object (which includes, in particular, the predicative complement with verbs like 'elect somebody a president,' 'nominate somebody a chairman,' and the traditional adverbial of result as in, e.g., 'he tore it into pieces').

Other complementations are classified as free modifications; though some types of adverbials are seldom found with a verb of a certain class, such combinations are not excluded by the language system; they are just made improbable or practically excluded by the conditions of the world we live in, i.e., by cognitive content.

The morphemic forms (means) corresponding to the valency relations have either the shape of affixes (endings, stem alternations) or of words (prepositions, subordinating conjunctions) which appear as such only due to shallow rules. This is similar to the morphemic counterparts of values of such grammatical categories as number, tense, modality. In the TRs all these units, which do not play an essential syntactic role, have the shape of indices (parts of complex labels), rather than of nodes.

When a unit of a TR is deleted by a surface rule, the speaker assumes that the hearer can easily recover the deleted item. It can happen that the speaker's assumption is mistaken and in this event the hearer can then ask for the suppressed item to be stated explicitly. In such a case the dialog is disturbed to a certain extent, as can be illustrated by (4a) and (4b). On the other hand, with (4c) following (4a) the situation is different: the hearer asks for an additional piece of information and the acceptability of the dialog is by no means disturbed.

Charles came by train. (4a)
Where did he come to? (4b)
When did he come? (4c)

The utterer of (4a) must be able to answer (4b); he cannot merely say 'I don't know' without disqualifying himself as a speaker. However, he need not know the answer to (4c), which he can explicitly admit without disturbing the connectedness of the dialog. As seen in example (4), this dialog test can serve as an operational criterion distinguishi between obligatory complementations of verbs deletable on the surface and optional ones.

It is assumed that each lexical entry has a valency frame (cf. the more recent notion of theta grid) assigned to it, where all the inner participants are listed for the given lexical unit, with an indication whether they are obligatory or optional. Free modifications may be listed once for all the verbs (nouns, adjectives, adverbs) in the grammar (see criterion (a) above for distinguishing between participants and modifications); only if a certain modification is obligatory with a given lexical head (as the direction 'where to' with 'come,' 'arrive,' etc., or manner with 'behave,' or location with 'stay,' etc.), then it should be also listed in its frame (for a classification of valency slots of nouns, see Piťha 1980).

Within this approach the participants are defined, essentially, on a semantic basis; however, if the verb does not have all the inner participants in its frame, then the tectogrammatical participants partly differ from the cognitive roles in a regular way. If the cognitive role which would primarily correspond to Patient is absent from the frame, while the role primarily corresponding to Addressee, Origin, or Effect is present, then this latter role is linguistically structured on the level of TRs as a Patient; in a similar vein, the cognitive role primarily corresponding to the Patient may be shifted to the position of Actor. This correspondence can be illustrated by the following shifts (5):

Patient → Actor (*the book appeared*) (5a)

Effect → Patient (*John became a teacher*) (5b)

Origin → Patient (*Bill abandoned his family*) (5c)

Addressee → Patient (*The chairman has addressed the audience*) (5d)

Under such a treatment it is possible to state that every verb having a single (inner) participant in its frame has an Actor there; if the verb has two participants, they are Actor and Objective; in this, FGD comes close to Tesnière's treatment of his first and second participants. Only if a verb has more than two participants, then one of them is Origin, Addressee or Effect, but Actor and Objective are always present in the valency frame of such a verb (as obligatory or optional participants).

4. Topic/Focus Articulation

4.1 *A Specification of the Basic Notions*

The main notions connected with topic/focus articulation (TFA; see Sect. 1.4 above for other terms referring, with some slight differences, to this issue) were characterized by Firbas (1956) first of all on the basis of the hierarchy of communicative dynamism (CD). By 'degree of CD carried by a linguistic element,' Firbas (1987: 23) understands 'the relative extent to which the element contributes towards the development of the communication within the sentence.' According to Firbas (1971: 141) the theme is then 'constituted by an element (elements) carrying the lowest, the rheme by an element (elements) carrying the highest degree(s) of CD within the distributional field. Elements ranking between theme and rheme constitute a kind of transition.' Though no overt criteria were then given for distinguishing the degrees of CD as determining the theme, the rheme and the transitional elements, the framework using the degrees of CD has brought many convincing results.

Sect. 4.3 below shows that a certain operational criterion can be found in the so-called 'question test'; the use of this test and the tests based on negation leads to the necessity of another underlying notion, namely that of contextual boundness. Contextual boundness corresponds directly to the distinction between pieces of information processed by the speaker as (a) points assumed to be readily available in the hearer's memory, and (b) ways of modification of these points attempted by the speaker through her/his message. The distinction between elements which are contextually bound and those which are nonbound also has an independent justification, e.g., on such grounds as the conditions for the use of weak (unstressed) pronouns or the semantic specification of the scope of negation.

Following up his previous considerations on the so-called 'communicative importance,' but working in more abstract terms, Firbas (1979, 1992) postulates 'a natural order (ordo naturalis)' of contextually nonbound elements of the sentence and suggests two context independent semantic scales reflecting a gradual rise of CD:

(a) scene (settings)—appearance/existence—phenomenon appearing/existing (possible prospective quality bearer); and
(b) scene (settings)—quality bearer—quality—specification—further specification(s).

In his more recent works, Firbas (1985) takes up the problem of the interrelations between TFA (functional sentence perspective), intonation, and emotiveness, throwing new light on the place of intonation as one of the means of expressing the distribution of the degrees of communicative dynamism over the sentence. The analysis is illustrated by a most detailed analysis of a continuous stretch of conversation.

More recently, Svoboda (1981) proposes to work with the concept of 'diatheme,' which he characterizes in several ways (not fully identical, as shown by Sgall 1987):

(a) as the thematic element carrying the highest degree of CD (p.5);
(b) as a temporary center of the scene, the newly introduced or just chosen quality bearer (p.42);
(c) as what was called by Mathesius 'the center of the theme' (p.42).

It is necessary to make a distinction between TFA and the cases of the so-called 'second instance,' i.e., of a correction of some misunderstanding concerning a part of a sentence (be it a slip of the tongue, a fault of perception, or an actual error); these sentences can be—at least in many cases—preceded by a string of the form '*Not*' ('that') . . . , 'but,' where . . . equals the given sentence, only the element bearing contrastive heavy stress being replaced by one of its antonyms: 'The book WAS published by Mouton'; 'To London he sent only FIFTY dollars.'

4.2 An Explicit Account of Topic/Focus Articulation (TFA)

The Prague research group of formal linguistics, following up the intuitive observations of the Prague School linguists presented since the 1930s, formulated an explicit, formal framework which makes it possible to describe TFA within a dependency-based account of the meaning of the sentence (see Sect. 3 above and Sgall, et al. 1986). The empirical background and the theoretical framework of this approach can be briefly sketched as follows.

In a theoretical description of language one has to account jointly for three layers of phenomena belonging to the same domain, namely

(a) the individual lexical items occurring in the sentence as contextually bound or as nonbound, the former use being possible only with items the speaker assumes to be salient, activated in the hearer's memory, Sect. 4.4. below;
(b) the division of the underlying (tectogrammatical) representation (TR) of the sentence into its topic and its focus; and
(c) the hierarchy of communicative dynamism (CD, 'deep word order'), rendered by the left-to-right ordering of the nodes of this representation (see above in Sect. 4.1 for Firbas's pioneering formulations on CD).

Informally, the focus of a TR of a sentence treated (with a simplification concerning coordination) as a dependency tree, can be specified as follows (see Sgall 1979):

(a) if the main verb or some of the nodes which directly depend on it (i.e., some of the 'deep cases' and other modifications) are contextually nonbound, then these nodes belong to the focus of the TR;
(b) if a node other than the root of the tree belongs to the focus, then also all nodes subordinated to it belong to the focus;
(c) if the root and also all its daughter nodes are contextually bound (cf. (a) in the previous paragraph), then it is necessary to specify the rightmost of the daughter nodes of the root and ask whether (some of) its own daughter node(s) is (are) nonbound; if so, then these nodes belong to the focus; if not, one again specifies the rightmost of the last set of sister nodes and asks whether some of its daughter nodes are nonbound, etc.

The nodes that do not belong to the focus of a sentence constitute its topic.

Attempting to describe the three layers of phenomena mentioned above in a unified way, functional generative description works with two rather strong hypotheses:

(a) the boundary between topic and focus is always placed so that there is a node A such that any node that is less dynamic than A belongs to the topic, and any which is more dynamic, to the focus; and
(b) the hierarchy of CD within focus is determined by an ordering of the kinds of complementations (of valency relations) which is given by the grammar (called 'systemic ordering'); on the other hand, within the topic permutations of the complementations are possible (see Hajičová & Sgall 1987; Hajičová 1994).

It is assumed that every sentence has a focus, since otherwise it would convey no information relevant for the communication, it would lack any illocutionary force; however, there are sentences without any topic (corresponding to thetic judgments).

An examination of Czech in comparison with English and several other languages has led to the conclusion that the systemic ordering of some of the main participants is identical for many languages, having the form: Actor–Addressee–Objective. As for Instrument, Origin, and Locative, it seems that English differs from Czech (and from German) in that these three complementations follow Objective in English, though they precede it in Czech.

Various questions of TFA are still open for a more detailed and systematic investigation, but the framework has been already built allowing for an explicit description of many of these phenomena. In addition, this framework helps to bring a better insight into such important linguistic issues as presuppositions and the semantic scope of linguistic negation (Hajičová 1973, 1974, 1984). Especially, it can be stated that the prototypical scope of negation is identical with the focus of the sentence. In connection with this, definite noun groups trigger presuppositions if they are included in the topic, not in the focus of a sentence: 'Our victory was (not) caused by Harry' presupposes that the victory took place, although 'Harry did not cause our victory' entails neither the presence nor the absence of victory (a case of allegation); 'The king of France is (not) bald' cannot be appropriately used as referring to the actual world, but 'Yesterday London was not visited by the king of France' may be used as a true utterance.

4.3 An Operational Test for Topic and Focus

As noted above one should look for operational criteria to identify the different phenomena from TFA. One of these tests, indicated by Hatcher (1956) and further developed especially by Daneš (1970) and Sgall & Hajičová (1977), is based on the assumption that for every sentence the intuitions of the speakers of the given language determine a set of *wh*-questions that can be appropriately (although redundantly) answered by the given sentence in different contexts. Thus, with the intonation center on a 'problem,' (6) can answer (7a) to (7d) while it cannot answer (7e) or (7f).

John talked to his neighbor about a problem. (6)

(a) What did John do? (7)
(b) What did John talk about to whom?
(c) What did John talk about to his neighbor?
(d) What was John's attitude towards his neighbor?
(e) Who talked to his neighbor about a problem?
(f) To whom did John talk about a problem?

The following rules (formulated here in terms of TRs, Sects. 3 and 4.2 above) may be understood as the basis of the question test.

(a) If the set of all those questions for which the given sentence can serve as an appropriate answer (called 'the set of relevant questions' in the following) fulfills the condition, for some phrases A and B included in the given sentence, that (the referent of) A is (referred to by a phrase) included in every question from the set in which B is included, and also in such a question (from the set) that does not include B, then in (all TRs of) the given sentence the (source of the) phrase A is less dynamic than the (source of the) phrase B;
(b) if A (from the given sentence) occurs in no element of the set of relevant questions, it is the focus proper (i.e., the most dynamic element) of the given sentence;
(c) if A (from the given sentence) occurs in every element of the set of relevant questions, then it belongs to the topic of the given sentence;
(d) if (a) is met by A and B, but either A or B breaks (b) and also (c), then the sentence is ambiguous in that the phrase breaking these two conditions belongs to its topic in some of its TRs and to its focus in some others;
(e) if there is a pair of phrases, A, B, in the given sentence such that A and B break (a) and neither A nor B meets (c), then the sentence is ambiguous not only with respect to the position of the boundary between topic and focus but also in that A is less dynamic than B in some of its TRs, being more dynamic than it is in some other; at most in one of these two cases both A and B belong to the focus.

If these conditions are applied to example (6) above, (7a) is fulfilled by the pairs 'John' and 'talked,' 'John' and '(to his) neighbor,' and also by every pair containing 'problem' as B and any other constituent (the verb or one of its participants) as A; thus in the scale (or linear ordering) of CD of all TRs of (6) 'John' precedes 'talk' as well as 'neighbor,' while each of the three precede 'problem.' The condition (b) is met by 'problem,' which is the focus proper of all TRs of (6), while 'John' belongs to the topic in all TRs since it fulfills (c). Since the condition (d) is met by the pair in which A and B are assigned the values of 'John' and 'neighbor,' respectively, or 'John' and 'talk' (and, trivially, also 'neighbor' and 'problem'), it may be stated that 'talk' (and 'neighbor') belongs to the topic in some TRs of (6) and to the focus in others.

If 'talk' is substituted for A and 'neighbor' for B (or vice versa), point (e) is fulfilled, so that there are such TRs in which 'neighbor' is more dynamic than 'talk' as well as others in which 'neighbor' is less dynamic, whereas only in the former case both the phrases may belong to the focus.

This shows that to a certain degree the question test is useful not only for drawing the boundary between topic and focus, but also for identifying the degrees of CD; the elements that belong to the topic only in some of the TRs of the sentence are more dynamic than those belonging to the topic in all the TRs, but less dynamic than the element that in all the TRs belongs to the focus (and thus constitutes the focus proper).

4.4 TFA *and the Structure of the Discourse*

As for the relationship between TFA of a sentence and the corresponding aspects of the patterning of the text, Daneš (1970, 1974) distinguishes three types of 'thematic progressions,' the first of which consists in the comment of a given utterance U_1 reappearing as the theme of the following utterance U_2 (as 'Last week I visited Lund. It is a nice university town ...'); in the second type the theme of U_1 is identical (or in an associative link, etc.) to that of U_2 (as, e.g., in 'Charles came to his AUNT. He wanted first of all to show his POLITENESS'); with the third type, the two utterances derive their topics from a hypertheme (as, e.g., in 'Three of the four rooms are rather LARGE. The windows lead into a GARDEN' with the hypertheme 'the apartment').

The interrelations between TFA of the sentences and the dynamic aspects of discourse can be also viewed from the point of view of a pragmatically understood psychological layer, taking into account the speaker's assumptions about the relative salience of the pieces of knowledge she/he assumes to share with the hearer (see Hajičová & Vrbová 1981; Sgall, et al. 1986: ch. 3; more recently, Hajičová 1993).

At the initial point of a discourse, the interlocutors share a certain stock of information (the stock of shared knowledge, SSK), a part of which is activated by the situational context. During the discourse, the SSK changes in accordance with what is in the center of attention at the given point of the discourse. The changes of the degree of salience depend to a great extent on the TFA of the sentence uttered.

(a) The items referred to by the focus of the immediately preceding utterance are the most activated ones at every time-point of the discourse.

(b) If an item is mentioned in the topic, then at least two issues are to be taken into consideration:
  (i) a pronominal reference strengthens the activation of the item referred to to a lesser degree than a reference with a full (definite) noun group;
  (ii) the activation of the items referred to in the topic fades away less quickly than that of the items referred to (only) in the focus of the preceding utterance(s).

(c) Also an item lacking a high degree of activation can be mentioned in the topic (or, more exactly, as contextually bound), if natural language inferencing makes it possible without much effort on the hearer's side to identify the item mentioned (on the basis of various associative links).

(d) If an item of SSK is not referred to in the given utterance, then its activation decreases (cf. point (b) (ii) above).

(e) Also other scales or hierarchies should be considered. Thus, there is a hierarchy of prominence with regard to the individual utterances and their positions in the discourse; e.g., utterances metatextually opening a narration or one of its portions, or headings are more prominent than other parts of the discourse, in that the items which the former introduce retain their activation to a higher degree than items introduced in the latter parts.

These observations were formulated, to a certain degree, in a framework that allows one to understand how the issues of reference assignment can be captured by finite means and to describe such notions as that of the topic of (a part of) a discourse.

5. Semantics

5.1 *Meaning of Morphemes*

Within the Prague School, semantics has always been understood as belonging to the core of the system of language. A first major contribution to the theoretical approach to semantics was Jakobson's (1936) analysis of the meanings of cases, which he understood as based on invariant units arranged in binary oppositions (analogically to phonological systems). This approach was shown by Pauliny (1943) to exhibit only a limited applicability within an account of the meaning of the sentence; however, it was elaborated into a much more general account of the meaning of morphemes of different kinds by van Schooneveld (1978) and others, whose approach offers many insights important for the classification of the units of the level of meaning.

5.2 *Meaning and Intensional Semantics*

Only in the second generation of the School did the semantic (or pragmatico–semantic) structure of the sentence start to be studied (see above Sects. 2–4), and in the 1980s a direct connection with research in formal semantics was achieved thanks to the joint efforts of the authors of FGD and of a group of logicians, who based their research on intensional semantics (using Tichý's 1971, 1988 transparent intensional logic). A certain division of labor is postulated: the proper task of linguistics is seen in an adequate description of the relationship between the outer shape of linguistic items and the level of meaning, while the transduction from the latter level to a formal system of intensional logic constitutes the task of an interdisciplinary cooperation; for the first attempts at a treatment of this transduction see especially Materna et al. (1980, 1987) searching for formal correlates of the topic–focus articulation of the sentence and communicative dynamism, and Materna & Sgall (1984) relating the predicates of formal logic (with their fixed arity) and the verbs of natural language (having obligatory and optional complementations).

It is proposed to deal with problems of semantic interpretation on the basis of the concept of sense, understood as linguistic (literal) meaning combined with a specification of reference (see Sgall, et al. 1986: 51ff.). If each of the meanings of a sentence is conjoined with a specification of the reference of the referring expressions contained in the sentence, then the sense obtained in this way determines a proposition, viewed as a partial function from possible worlds into truth values. This allows an assertion not to assign a truth value to a possible world, if the presuppositions of that assertion are not satisfied in that world.

The meaning of a (declarative) sentence can thus be understood as a procedure enabling the hearer to find the sense h of a sentence token, provided the proper reference assignment is known to her/him; as far as she/he knows the relevant features of possible worlds, the hearer is then enabled by Prop(h) to find the truth value of the particular utterance, if the presuppositions of h are met (see Sgall 1994).

5.3 *A Criterion for the Identity of Meaning*

The distinction between linguistic meaning and cognitive content (see Sect. 1.2 above) can be operationally specified on the basis of the following delimitation of synonymy (cf. Sgall, et al. 1986: ch. 1).

Two expressions (morphemes or elementary surface syntactic constructions) a and b are strictly synonomous (have a meaning in common) if, for every pair of sentences A and B, where A differs from B only in that A contains a in the same position in which B contains b, it holds that for every utterance of A and of *B* there is a set of corresponding propositions they have in common. (*A* and *B* should not contain quotational contexts so that such contexts as 'The noun' stay/sojourn 'has two syllables' are excluded.)

The following pair of sentences illustrates how the criterion operates: 'Charles sold a car to Paul' and 'Paul bought a car from Charles.' The set of possible worlds with regard to which the two sentences are true is identical; however, the so-called 'converse predicates' 'buy/sell' are not synonymous because if they are inserted in a different context (lexical setting), the synonymy condition is not met; 'Charles was selling a car to Paul' and 'Paul was buying a car from Charles' certainly do not share their truth conditions since in the former situation, before the action was completed, the addressee may not be willing to buy a car, which cannot be the case for the latter situation. Another point is that the two word order patterns are not synonomous, expressing different instances of TFA.

This operational criterion makes it possible to establish a set of units of the level of meaning (specifying expressions which share a meaning they convey). In this way one of the fundamental issues of structural semantics can be settled, since the delimitation of the level of meaning can be used to draw the borderline between the linguistically structured part of semantics and the cognitive content, as has been postulated since Saussure.

Bibliography

Daneš F 1964 A three-level approach to syntax. In: *Travaux linguistique de Prague 1*. Academia, Prague

Daneš F 1968 Some thoughts on the semantic structure of the sentence. *Lingua* **21**: 55–69

Daneš F 1970 Zur linguistischen Analyse der Textstruktur. *Folia Linguistica* **IV**: 72–78

Daneš F 1974 Functional sentence perspective and the organization of the text. In: Daneš F (ed.) *Papers on Functional Sentence Perspective*. Academia, Prague

Daneš F 1987 Sentence patterns and predicate classes. In: Steele R, Threadgold T (eds.) *Language Topics*. Benjamins, Amsterdam

Daneš F, Hlavsa Z, Kořenský J 1981 *Větné vzorce v češtině*. Academia, Prague

Dokulil M, Daneš F 1958 K tzv. významové a mluvnické stavbě věty. In: *O vědeckém poznání soudobých jazyků*. Nakladatelství ČSAV, Prague

Firbas J 1956 Poznámky k problematice anglického slovního pořádku z hlediska aktuálního členění větného. *Sborník prací filosofické fakulty brněnské university* (Brno) **A4**: 93–107

Firbas J 1971 On the concept of communicative dynamism in the theory of functional sentence perspective. *Brno Studies in English* **7**: 12–47

Firbas J 1979 A functional view of 'ordo naturalis.' *Brno Studies in English* **13**: 29–59

Firbas J 1985 Thoughts on functional sentence perspective, intonation and emotiveness. *Brno Studies in English* **16**: 11–48

Firbas J 1987 On two starting points of communication. In: Steele R, Threadgold T (eds.) *Language Topics I*. Benjamins, Amsterdam

Firbas J 1992 *Functional Sentence Perspective in Written and Spoken Communication*. Cambridge University Press, Cambridge

Hajičová E 1973 Negation and topic versus comment. *Philologica Pragensia* **16**: 81–93

Hajičová E 1974 Meaning, presupposition and allegation. *Philologica Pragensia* **17**: 18–25

Hajičová E 1984 Presupposition and allegation revisited. *Journal of Pragmatics* **8**: 155–67

Hajičová E 1993 *Issues of Sentence Structure and Discourse Patterns*. Charles University, Prague

Hajičová E 1994 Topic/focus and related research. In: Luelsdorff P A (ed.) 1994: 245–75

Hajičová E, Panevová J 1984 Valency (case) frames of verbs. In: Sgall P (ed.) *Contributions to Functional Syntax. Semantics, and Language Comprehension*. Academia, Prague

Hajičová E, Sgall P 1987 The ordering principle. *Journal of Pragmatics* **11**: 435–454

Hajičová E, Vrbová J 1981 On the salience of the elements of the stock of shared knowledge. *Folia linguistica* **XV**(**3–4**): 291–303

Hatcher A G 1956 Syntax and the sentence. *Word* **12**: 234–250

Jakobson R 1936 Beitrag zur allgemeinen Kasuslehre. In: *Travaux du Cercle linguistique de Prague* **VI**. Jednota československých matematiků a fyziků, Prague

Karcevskij S J 1931 Sur la phonologie de la phrase. In: *Travaux du Cercle linguistique de Prague* **IV**. Jednota československých matematiků a fyziků, Prague

Karcevskij S J 1937 Phrase et proposition. In: *Mélanges de linguistique et de philologie offerts à J. van Ginneken*. Librairie C. Klincksieck, Paris

Kuryłowicz J 1949 Le problème de classement des cas. *Biuletyn polskiego towarzystwa językoznawczego* **IX**: 20–43

Luelsdorff P A (ed.) 1994 *Prague School of Structural and Functional Linguistics*. Benjamins, Amsterdam

Luelsdorff P A, Panevová J, Sgall P (eds.) 1994 *Praguiana 1945–1990*. Benjamins, Amsterdam

Materna P, Hajičová E, Sgall P 1987 Redundant answers and topic–focus articulation *Linguistics and Philosophy* **10**: 101–13

Materna P, Sgall P 1980 Functional sentence perspective, the question test and intensional semantics. *SMIL—Journal for Linguistic Calculus* **1**(**2**): 141–60

Materna P, Sgall P 1984 Optional participants in a semantic interpretation. In: Sgall P (ed.) *Contributions to Functional Syntax, Semantics, and Language Comprehension*. Academia, Prague

Mathesius V 1928 On linguistic characterology with illustrations from Modern English. *Actes du 1er Congrès International des Linguistes*: 56–63

Mathesius V 1929 Zur Satzperspektive im modernen Englisch. *Archiv für das Studium der neueren Sprachen und Literaturen* **155**: 202–10

Mathesius V 1936 On some problems of the systematic analysis of grammar. In: *Travaux du Cercle linguistique de Prague* **VI**. Jednota československých matematiků a fyziků, Prague. Repr. in: Vachek J 1964

Mathesius V 1975 *A Functional Analysis of Present Day English on a General Linguistic Basis*. Mouton, The Hague (Ed. by Vachek J)

Panevová J 1974–75 On verbal frames in functional gen-

erative description I, II. *Prague Bulletin of Mathematical Linguistics* **22**: 3–40; **23**: 17–52
Panevová J 1977 Verbal frames revisited. *Prague Bulletin of Mathematical Linguistics* **28**: 55–71
Pauliny E 1943 *Štruktúra slovenského slovesa*. Bratislava
Piťha P 1980 Case frames of nouns. In: *Linguistic Studies Offered to Berthe Siertsema*. North Holland, Amsterdam
Schooneveld C H van 1978 *Semantic Transmutations*, vol. 1. Physsardt, Bloomington, Indiana
Sgall P 1964 Zur Frage der Ebenen im Sprachsystem. In: *Travaux linguistiques de Prague* **1**. Academia, Prague
Sgall P 1979–80 Towards a definition of focus and topic. *Prague Bulletin of Mathematical Linguistics* **31**: 3–25; **32**: 24–32. Repr. 1981 in: *Prague Studies in Mathematical Linguistics* 7. Academia, Prague
Sgall P 1980 Case and meaning. *Journal of Pragmatics* **4**: 525–36
Sgall P 1987 The position of Czech linguistics in theme focus research. In: Steele R, Threadgold T (eds.) *Language Topics*. Benjamins, Amsterdam
Sgall P 1994 Meaning, reference and discourse patterns. In: Luelsdorff P A (ed.) 1994: 277–309
Sgall P, Hajičová E 1977–78 Focus on focus. *Prague Bulletin of Mathematical Linguistics* **28**: 5–54; **29**: 23–41
Sgall P, Hajičová E, Panevová J 1986 *The Meaning of the Sentence in its Semantic and Pragmatic Aspects*. Reidel, Dordrecht, Academia, Prague
Skalička V 1935 *Zur ungarischen Grammatik*. Universita Karlova, Prague
Svoboda A 1981 *Diatheme*. Universita J E Purkyně, Brno
Šmilauer V 1947 *Novočeská skladba*. Prague
Tesnière L 1959 *Eléments de syntaxe structurale*. Librairie C. Klincksieck, Paris
Thèses présentées au Premier congrès de philoloques slaves 1929. In: *Travaux du Cercle linguistique de Prague* **1** 5–29. Jednota československých matematiků a fyziků, Prague
Tichý P 1971 An approach to intensional analysis. *Noûs* **5**: 273 97
Tichý P 1988 *The Foundations of Frege's Logic*. Walter de Gruyter, Berlin
Vachek J 1964 *A Prague School Reader in Linguistics*. Indiana University Press, Bloomington, Indiana

The Glossematic School of Linguistics

Erik C. Fudge

'Glossematics' was an approach to the study of language carried on mainly in Denmark between the mid-1920s and the mid-1950s under the leadership of Louis Hjelmslev (1899–1965). It represents in general a development of certain principles first put forward by Ferdinand de Saussure, in particular the principle that the importance of the units of a language is that they are distinct from one another, rather than that they exhibit particular concrete properties.

The glossematicians aimed to devise a universal framework within which the description of particular languages could be carried out. Their approach was intended as a thoroughgoing attempt to reshape linguistics as an exact science: this reflects important features (see Sect. 2) of 'logical positivism,' the most influential philosophical movement of the time.

1. Outline of the History of the Glossematic Movement

Denmark has a strong tradition of linguistic study going back at least as far as Rasmus Kristian Rask (1787–1832). It was therefore not surprising that an active movement in structural linguistics should originate in Copenhagen. After studying Romance philology and comparative philology, and working on Lithuanian, Hjelmslev published his first major book *Principes de grammaire générale* in 1928.

As early as 1924 Hjelmslev had spent time in Prague (before the foundation of the Linguistic Circle there), but it was not until 1931 that he became particularly concerned with phonology. In that year the phonologists of the Prague School had made striking contributions to the International Congress of Linguistics held in Geneva (see *Prague School Phonology*); this resulted in the formation of bodies analogous to the Linguistic Circle of Prague in a number of places, Copenhagen among them.

From the beginning, Hjelmslev's approach to sound structure differed considerably from Prague phonology, which he criticized as being excessively phonetic in its definition of basic units such as the phoneme. He and his principal collaborator Hans Jørgen Uldall (1907–57) coined the term 'phonematics' to refer to the theory on which they were working: the titles of the papers they gave in 1935 to the International Congress of Phonetic Sciences in London include this new term.

The Copenhagen Circle aimed to publicize its work from quite early on—a regular *Bulletin* appeared from 1934; however, their series of *Travaux* (analogous to the series of highly influential linguistic studies emanating from the Prague Circle in the years 1929–39) was not inaugurated until 1944. Before then, most of the important Copenhagen contributions appeared in periodicals, or in the proceedings of a number of international congresses. The one full-length book produced in this period was Hjelmslev's *La catégorie des cas* (1935; see Anderson 1971, 1977).

Coincidentally, the term 'glossematics' itself dates from 1935; Hjelmslev and Uldall felt that they were now ready to proceed to the construction of a general theory of language which was rather different from most of the theories hitherto proposed under the title of 'linguistics.' The two scholars planned a joint book on the theory, to be entitled *An Outline of Glossematics*. Although a very brief *Synopsis* was produced in 1936, little progress was made on the complete work. Separation during World War II meant they had to work independently on the theory; by the time they were able to get together again (in 1951), they found their ideas had diverged to the point of making the production of a joint publication difficult.

In the meantime, in 1943 Hjelmslev had produced what became his major work, *Omkring sprogteoriens grundlæggelse*: being written in Danish, it was for some while inaccessible to the majority of linguists. Hjelmslev's visit to the USA in 1952 to teach at the Summer Institute of the LSA led to the production of the authorized English translation *Prolegomena to a Theory of Language* in 1953 (2nd edn. 1961).

Hjelmslev's fiftieth birthday in 1949 was marked by the publication of a volume of essays *Recherches structurales 1949*, subtitled *Interventions dans le débat glossématique*. Although 16 of the 24 contributions are by other Danish scholars (including Uldall), the remaining eight clearly show that Hjelmslev enjoyed an international reputation by this time: the authors include Roman Jakobson (Harvard, USA, formerly of the Linguistic Circle of Prague), Jerzy Kuryłowicz (Kraków, Poland), Emile Benveniste (Paris), and André Martinet (Paris, but at the time attached to Columbia University, USA).

A further important indication of Hjelmslev's growing reputation outside Denmark was the appearance in 1955 of Berthe Siertsema's *A Study of Glossematics: Critical survey of its fundamental concepts* (2nd edn., 1965), a book which remains one of the most detailed and constructively critical treatments of Hjelmslev's theory.

Most of the large-scale works emanating from the movement at this time were general and theoretical in nature. One exception is the book published in 1951 by Knud Togeby (1918–74) entitled *Structure immanente de la langue française*: although set within the framework of a version of glossematic theory, it is a sustained treatment of the form and substance of French (see Sect. 6 for more detail). Another extended treatment of a particular language (Spanish) in a glossematic framework, also published in 1951, was Emilio Alarcos Llorach's *Gramática estructural (según la escuela de Copenhague y con especial atención a la lengua española)*.

Uldall completed his Part I of the projected *Outline of Glossematics* (in page proof as early as 1952), but the divergence of their views meant that Hjelmslev found himself unable to write his Part II to fit with it. Part I was eventually published on its own in 1957, the year of Uldall's death. Between then and his own death in 1965, Hjelmslev produced no other large-scale works.

For a fuller historical account of the movement, see Fischer-Jørgensen (1975: ch. 7).

2. Logical Positivism and Glossematics

The following four characteristics of logical positivism exerted a strong influence on glossematics:

(a) metaphysical sentences are not false but meaningless, and must therefore be avoided (Sect. 2.1);
(b) science must account for as many empirical facts as possible by means of logical deduction from as few axioms (initial assumptions) as possible (Sect. 2.2);
(c) structural statements are to be preferred to statements of content (Sect. 2.3);
(d) scientific language should be a kind of algebra, with all terms being unambiguously defined (Sect. 2.4).

2.1 Avoidance of Metaphysical Claims

Traditionally, the glossematicians claimed, the view had been taken that methods appropriate for the humanities were quite different from those appropriate for the sciences. According to this traditional view, the basis for the difference was that the unpredictable 'human factor' was central in the study of the humanities, but missing from the sciences, in which all variables were controllable.

A refutation of this position was attempted in terms of an analogy: 'If two candles on the dining-table do not burn exactly alike[...]it might, analogously, be inferred that the candle factor is too strong to permit physics and chemistry to be merely mechanical in operation' (Uldall 1957: 2). Clearly the 'candle factor' could be made explicit in terms of structural differences in the candles, the influence of air currents, and other controllable physical and chemical aspects of the situation. So the issue was whether or not linguistics could attempt to make relevant aspects of the 'human factor' more explicit.

To account for linguistic phenomena in terms of this human factor (or 'mind,' 'world-view,' etc.) without further explanation would clearly be to use language in a metaphysical way which the logical positivists would have found objectionable. This avoidance of metaphysical language makes an interesting comparison with the antimentalism of the linguistics of the same period in the USA (see *Post-Bloomfieldian Phonology*).

2.2 Deductive Reasoning

'Inductive' reasoning argues from observed data to inferred theory. However, any theory which is arrived at by this method cannot be tested by the same method. Testing needs a different method, 'deductive' reasoning, which proceeds in the opposite direction from inductive reasoning.

Deductive reasoning in fact assumes a theory and on that basis predicts the kinds of data that will be observed; the validity of the assumed theory may be tested by comparing these predictions with the data that actually occur—if the predictions are at variance with the data, the theory is thereby shown to be false, while if the fit between predictions and data is good, the theory is thereby supported, though not shown incontrovertibly to be true.

It is clear that, in any type of scientific enquiry, both types of reasoning are needed. There is, however, an important difference between the two: inductive methods are a matter of trial-and-error, and so are difficult, if not impossible, to describe coherently deductive methods are a matter of drawing conclusions from premises using well-defined logical processes.

Glossematicians certainly use the two terms 'inductive' and 'deductive,' but it is important to bear in mind that their usage does not conform exactly to the more usual explanation of the terms given here.

2.3 Importance of Structural Statements

There are some areas, for example color perception, where it is difficult to make a precise statement of content, e.g., 'A sees this color as a shade of green tending towards turquoise'; it is often easier to achieve precision by making relational statements such as 'A sees colors X and Y as distinct from each other, whereas B sees X and Y as the same color.' This relational statement leaves out of account the 'greenness' or 'turquoiseness' or other specific property of colors X and Y.

Extension of this approach to aspects of language description was one of the key elements in the thought of Saussure. When dealing with the inner system of a language, it was for him much less important to ask 'What are the physical properties of this sound?' than to ask 'Are these two sounds the same, or distinct?' The glossematicians took this approach to a conclusion judged by some scholars to be beyond the limits of feasibility.

2.4 Reduction of Scientific Language to an Algebra

Sentences using constructions of the kind which are typical of metaphysical discourse (such as 'the form of this utterance is governed by certain ideas present in the speaker's mind') should be excluded from scientific discourse; furthermore, all terms used should be defined unambiguously. Although suitable algebras were available to glossematics for its purpose, its proponents, notably Uldall, seem to have expended a good deal of energy in attempting to evolve an algebra of their own.

3. Form and Substance in Glossematics

Saussure viewed the structural system of a language as a form linking two kinds of substance: phonic (sounds) and conceptual (ideas). Both kinds of substance were described by him as formless masses (*'masses amorphes'*), one phonetic and the other semantic. The worlds of sound and idea can be conceptualized only by having form superimposed on them by the structural system of a language.

Although glossematicians also use the term 'substance,' they take it in a different sense—they view it, not as the formless masses themselves (to refer to which Hjelmslev uses a term translated into English as 'purport'), but as the *result* of operating on purport in terms of the abstract distinctions of which the 'form' consists. Thus form is logically prior to substance.

3.1 Form and Substance in the Area of Sounds

In the area of phonology and phonetics, for example, the purport is the whole range of possible sounds which the human vocal apparatus is capable of producing, i.e., the subject matter of general (language-independent) phonetics. On the other hand, the substance is the (comparatively restricted) range of sounds actually used by speakers of a language or language variety, i.e., the subject matter of language-specific phonetics.

Thus, for instance, the continuum formed by the pharynx, palate, teeth, and lips is a matter of general human anatomy; it is therefore language-independent, and belongs to purport. However, this continuum will be divided up differently in different languages: the form of the particular language acts on the purport to produce the substance of that language.

Many languages will have a substance exhibiting a division of this particular continuum into three, giving a three-way distinction of place of articulation: a back [k]-area, a middle [t]-area, and a front [p]-area. In other languages, the continuum is divided into four parts: the [k]-area may be further divided (as in Eskimo—uvular consonants distinguished from velar), or the [t]-area may be further divided (as in Hindi—retroflex consonants distinguished from dental).

From the point of view of the form of a language, the fact that the 'place of articulation' continuum is divided into three, or four (or in some languages more) is more important than what the three, or four (or more) places of articulation within the substance actually are.

3.2 Form and Substance in the Area of Ideas

Here one might take as an example of purport the infinite range of different color hues which exist. Each language specifies this infinite range in terms of a number of basic categories, most notably in the area of hue; some languages have a larger number of basic color terms than others.

Not only words are involved in form in this area: examples are very common in which prefixes or suffixes relate to each other formally in this way. Take, for instance, the aspect of purport represented by the (language-independent) continuum of time. On the level of form, many languages have a two-way distinction which, when applied to this continuum, often gives rise to a basic 'past' versus 'non-past' division on the level of substance, a division made manifest in two different sets of inflections.

3.3 *Logical Priority of Form*

Glossematicians recognize that form as well as purport is twofold, and that therefore substance is twofold; this yields four areas of study within every language:

(a) 'content-substance' (roughly meanings of words and of morphosyntactic properties of the language);
(b) 'content-form' (roughly morphological, syntactic, and lexical structure of the language);
(c) 'expression-form' (roughly phonology of the language);
(d) 'expression-substance' (roughly phonetics of the language).

Content and expression are on a footing of equality—each of them is presupposed by the other. On the other hand, form is logically prior to substance—there can be no substance unless form has done its work.

The conclusion drawn by glossematicians from this logical priority is that the scientific description of form must be entirely independent of substance, and, a fortiori, of purport. The science of the expression is thus not a phonetics, nor is the science of the content a semantics. Expression-form was claimed to be independent of phonetics, on the grounds that expression-form may be manifested not only in sounds (as in a spoken language) but also in, for example, writing, morse code, or manual signs. For both expression and content, a language must be described in terms of its own 'immanent' structure.

3.4 *Form: Discovery and Verification*

Critics of glossematics often raised the objection: 'How can anything be discovered about form without reference to substance?' After all, the basic tool for investigating how languages work has to be to ask the question 'Does changing a sound in an utterance change its meaning, and vice versa?' Glossematicians certainly used this tool in the form of the so-called 'commutation test': in their terminology, 'Does a change on the level of the expression entail a change on the level of the content, and vice versa?'

The apparent paradox is resolved by noting that it is not on the level of discovery that substance must be excluded from consideration. The discovery phase of any scientific enterprise is inductive (see Sect. 2.2) in nature: the investigator must begin by examining observable data, which of course must involve physical properties of substance. He or she then proceeds to set up hypotheses about what must be the abstract formal system capable of accounting for the data.

The workings of this formal system, on the other hand, are deductive (see Sect. 2.2); here the starting point is the hypothesized basic entities, the relations between them being stated formally, i.e., in terms which are not related to substance. As the deductive process continues, the elements concerned are put into correspondence with more and more properties of substance.

This is what Hjelmslev meant when he claimed (1961: 79) that glossematics 'would be an algebra of language, operating with unnamed entities, i.e., arbitrarily named entities without natural designation, which would receive a motivated designation only on being confronted with the substance.' This approach is exemplified in Sect. 6 below, from Togeby's work.

4. The Analytical Procedure of Glossematics

The complete procedure, including both inductive and deductive aspects, is said by Siertsema (1965: 24–25) to be best understood in terms of seven steps. The important features of each step can be summarized as follows:

(a) For a particular language, the expression units (phonemes, syllables, etc.) and the content units (word-roots, prefixes, etc.) must be discovered by means of:
    (i) relationships holding between content units and (combinations of) expression units, established by applying the commutation test (see Sect. 3.4); and
    (ii) properties of substance of these units.
(b) Relationships holding between an expression unit and other expression units of that language, and relationships holding between a content unit and other content units of that language, must be described without reference to their substance.
(c) The units and their relationships are tentatively drawn up into a hypothesized system for the language.
(d) Steps (a)–(c) must be repeated for as many languages as possible.
(e) Extrapolation must be made from the total of relations actually found in these languages to the total of theoretically possible relations.
(f) These theoretically possible relations must be combined into a calculus which constitutes the system of language, rather than the system of a particular language or of many particular languages.
(g) Each particular language will then be characterized by the subset of actually occurring relations which it has 'selected' from the total of theoretically possible relations. This characterization will enable the tentative systems set

up under (c) to be revised and brought nearer to their definitive form.

Steps (a)–(d) are clearly inductive, leading to a set of tentative language systems. Steps (e) and (f) introduce a deductive system which is universal, i.e., language-independent; this is then used in step (g) to make predictions which will be the means of making revisions to the tentative language systems.

This approach diverges markedly from that of the post-Bloomfieldians in American Structuralism (see *American Structuralism*), who believed that a sound theory should be based on the correct method of proceeding from observable data to hypothesized system. For them the inductive method alone was scientifically respectable, and they sought to work in terms of a completely specified discovery procedure. Only steps (a) and (c) of the glossematic procedure would have won their full approval.

5. Basic Relations in Glossematics

If, as glossematicians held, relations between entities in a theory are more basic than the physical properties of those entities, then it is of fundamental importance to have a typology of such relations. The relations in fact constitute an important part of the axioms of the theory.

The basic dependence is '*a* presupposes *b*' (i.e., 'if *a* occurs, then *b* occurs' or '*a* cannot occur without *b*'). A more complex set of dependences can be built up on this foundation: for example, three complex dependences which crop up frequently in linguistic study are:

(a) Interdependence—*a* presupposes *b* and *b* presupposes *a*. Here *a* and *b* may occur together, but neither of them without the other.

(b) Determination—*a* presupposes *b* but *b* does not presuppose *a*. Here *a* and *b* may occur together, and *b* may occur alone, but *a* may not occur alone (in which case *a* is referred to as the *variable* and *b* as the *constant*).

(c) Constellation—*a* and *b* are compatible but neither presupposes the other. Here *a* and *b* may occur together, *b* may occur alone, and *a* may occur alone.

There are other logical possibilities, such as '*a* precludes *b*,' which are not given labels, on the grounds that they play no real part in the analysis of language systems or texts.

A further distinction is brought in, between syntagmatic ('both–and') relations and paradigmatic ('either–or') relations. Each resulting type of relation is referred to by a label as shown in Fig. 1. Thus in looking at a language system, the relation between vowel and consonant is always a 'complementarity,' since there are no languages which do not have both vowels and consonants. However, in looking at texts in languages, the situation will depend on the language. In those languages where all syllables have a vowel and at least one consonant, the relation is a 'solidarity'; in languages where some syllables consist of a vowel alone, the relation is a 'selection.'

Dependence	*'Both–and'*	*'Either–or'*
determination	selection	specification
interdependence	solidarity	complementarity
constellation	combination	autonomy

Figure 1. Types of dependence in glossematics.

The importance of this system of relations is not the terminology, but the fact that such relations, rather than any properties of substance, are felt to be of prime importance in glossematics.

6. The Procedure Exemplified

Togeby's *Structure immanente de la langue française* of 1951 puts forward a deductive system whose aim is to account for the whole range of possible texts in French. Some of the more detailed statements are specific to French (e.g., statement (c), Phonology, §6.2), but many statements are to be taken as general (universal) (e.g., statement (f) in §6.3, Syntax). Some statements are included with the aim of completeness on the general level, but with the specific caveat that they do not hold for French (e.g., statement (d), Phonotactics, §6.2).

The summary of this work given below is intended to show what glossematicians believed the description of a language had to cover. This included an inventory of the items which were important within a language, and a statement of how these items could be combined. The scope of the description should be noted: unlike some other grammatical theories, this one went beyond the level of the sentence, and attempted to give an account of the structure of larger bodies of material. Thus 'text' in the previous paragraph is intended to mean any discourse—not only written, but also spoken.

The description begins by introducing the entity 'text.' No definition of the term 'text' is given directly, but in fact the sequence of statements which follows, if applied correctly, produces something which does constitute a correctly constructed text in French. All other terms in the description will gain a definition in analogous fashion. This illustrates Hjelmslev's claim about how the theory works (see Sect. 3.4).

One type of statement within the theory deals with constructions: a 'syntagmatic' statement of the form X: Y + Z. This may be read as 'X has components Y and Z': the order of Y and Z is not necessarily sequential, at least as far as the 'content' part of the grammar is concerned. The similarity between these statements of the glossematic theory and phrase-structure rules in generative grammar (X → Y + Z) is noteworthy.

The other type of statement deals with systems: a 'paradigmatic' statement of the form X: Y, Z, W, meaning 'Xs are either Ys or Zs or Ws.' Alternatively this may be cast in the form:

X: Y
   Z
   W

Again the parallel with one type of rule in generative grammar is noteworthy.

The set of operations is divided into three main sections:

(a) a set of operations which applies in parallel fashion to expression and content alike (see Sect. 6.1);
(b) a set of operations which applies to expression alone (see Sect. 6.2);
(c) a set of operations which applies to content alone (see Sect. 6.3).

Each set is then further subdivided into a syntagmatic subset (dealing with constructions on a particular level) and a paradigmatic subset (dealing with the elements from which a choice may be made at the appropriate point).

6.1 French: Description Involving both Expression and Content

The syntagmatic subset is named 'syntagmatics,' and consists of the following operations:

(a) *Text*: expression line + content line. (The text is divided into two simultaneous parts, one on the level of expression, the other on the level of content.)
(b) *Line*: modulation sentences. (Each of the two lines is divided into successive units consisting of intonation plus sentence; see operation (c).)
(c) *Modulation sentence*: modulation unit + sentence. (The modulation unit is a sentence-length sequence of intonation groups.)
(d) *Modulation unit*: modulation elements. (The modulation element is the intonation pattern associated with a single tone-group.)

The paradigmatic subset is named 'systematics,' and consists of the following operations:

(a) *Elements*: phonemes; morphemes; morpho-phonemes; onomatopoeias. This division is carried out on the basis of whether the element is associated with the expression ('phonemes'), with the content ('morphemes'), with both ('morpho-phonemes'—elements further defined in operation (b)), or with neither ('onomatopoeias'—expressions like *pstt* which do not enter into constructions, and which need not obey the normal phonological rules of the language).
(b) *Morpho-phonemes*: modulations; emphases. (Modulations are intonation elements; emphases are emphatic or contrastive stresses.)

6.2 French: Description of the Expression

The syntagmatic subsection is named '*Prosodie*,' which might best be translated 'phonotactics'). This consists of the following operations:

(a) *Sentence*: syllable-groups. (Syllable-groups are very much like words, but that term is reserved for the content; see Sect. 6.3).
(b) *Syllable-group*: word-accent + syllable-group. (An operation which does not apply for French; 'word-accent' refers to the tonal elements in languages like Swedish.)
(c) *Syllable-group*: syllables.
(d) *Syllable*: accent + syllabic base. (Another operation which does not apply for French; 'accent' refers to tone in languages like Chinese, or word-stress in languages like English.)
(e) *Syllabic base*: nucleus + margin. (The syllabic base consists of the segments (vowels and consonants) which go to make up the syllable; the nucleus is formed of vowels, or, in the absence of vowels, of consonants of high sonority (nasals or liquids)—the margin is formed of consonants.)
(f) *Margin*: consonants. (The fact that some consonants may precede the nucleus and others may follow it is not specifically noted in the operation: linear order of elements is not part of this section of the theory.)
(g) *Nucleus*: marginal vowel + central vowel + marginal vowel. ('Central vowel' not in the sense of 'midway between front and back,' but indicating centrality within the nucleus—more prominence than the others, and often a greater degree of openness.)

The paradigmatic subsection is named 'phonology,' and consists of four operations:

(a) *Phonemes*: accents; vowels; consonants. (French has no accents, i.e., distinctive stresses.)
(b) *Accents*: strong; weak.
(c) *Consonants* (inventory of 17 for French).
(d) *Vowels* (inventory of 10 for French).

6.3 French: Description of the Content

The syntagmatic subsection is named 'syntax,' and consists of seventeen operations, beginning with 'sentence,' and proceeding in a fashion resembling the phrase-structure rules of generative grammar via 'words' down to the smallest grammatical elements, 'morphemes.' Examples of the operations involved:

4. *Clause*: circumstantial complement + clause-nucleus
5. *Circumstantial complement*: $\left\{\begin{array}{l}\text{preposition + object}\\ \text{subordinating conjunction + clause}\end{array}\right.$
6. *Clause-nucleus*: subject + predicate
7. *Subject*: apposition + nominal phrase
8. *Predicate*: $\left.\begin{array}{l}\text{object}\\ \text{attribute}\end{array}\right\}$ + verbal phrase

15. *Word*: stem + inflexions
16. *Stem*: root + derivational marker

NB: the numbering of the above subset of operations follows that of the text, and differs from the summary table appearing later in the book.

The paradigmatic part is entitled 'morphology' and consists of the following statements:

2. *Morphemes*:
   inflexions
   roots
   derivational markers
   particles
3. *Inflexions*:
   verbal: mood, aspect, tense
   verbo-nominal: person, number
   nominal: case, comparison, gender
4. *Roots*:
   verbs: auxiliary verbs, ordinary verbs
   nouns: proper nouns, pronouns, numbers, substantives, adjectives
5. *Derivational markers*:
   prefixes, suffixes, non-finite verb
6. *Particles*:
   adverbs, linking words, interjections
   linking words: subordinating conjunctions, prepositions, co-ordinating conjunctions

7. Conclusion

Although the theory of glossematics has not been further elaborated since Hjelmslev's death, there can be no doubt that many linguistic scholars in Denmark, and also some outside Denmark, have been greatly stimulated by the views he put forward and the questions he raised. Fischer-Jørgensen's work (1975: ch. 7) is a good starting point for understanding the theory and how it developed; Siertsema (1965) gives a profound exposition and critique of Hjelmslev's work.

Perhaps the best exemplification of the theory with special reference to a particular language is Togeby (1965). There is also in this work a considerable amount of valuable comparison with other approaches.

Of Hjelmslev's own works, Hjelmslev (1961) is in many ways central for the understanding of his theory; on the other hand, some of his collected essays (Hjelmslev 1959, 1973) are considerably less difficult for the nonspecialist.

Bibliography

Anderson J M 1971 *The Grammar of Case: Towards a Localistic Theory*. Cambridge University Press, Cambridge

Anderson J M 1977 *On Case Grammar: Prolegomena to a Theory of Grammatical Relations*. Croom Helm, London

Fischer-Jørgensen E 1975 *Trends in Phonological Theory*. Akademisk Forlag, Copenhagen

Hjelmslev L 1959 *Essais linguistiques*. Nordisk Sprog- og Kulturforlag, Copenhagen

Hjelmslev L 1961 *Prolegomena to a Theory of Language*, 2nd edn. University of Wisconsin Press, Madison, Wisconsin (Transl. by Whitfield F J)

Hjelmslev L 1973 *Essais linguistiques II*. Nordisk Sprog- og Kulturforlag, Copenhagen

Recherches structurales 1949. Nordisk Sprog- og Kulturforlag, Copenhagen

Siertsema B 1965 *A Study of Glossematics*, 2nd edn. Brill, Leiden

Togeby K 1951 *Structure immanente de la langue française*. Larousse, Paris

Uldall H J 1957 *An Outline of Glossematics*, Part I. Nordisk Sprog- og Kulturforlag, Copenhagen

---

Firth and the London School of Linguistics

F. R. Palmer

John Rupert Firth (1890–1960) was Professor and Head of the Department of General Linguistics in the Department of Phonetics and Linguistics in the School of Oriental and African Studies in the University of London from 1941–56, after having served as Senior Lecturer and as Reader in that Department from 1938. The title of Professor of General Linguistics was conferred on him in 1944. He had previously been Professor of English in Lahore, India (1920–28) and from 1928–38 Senior Lecturer in the Department of Phonetics at University College London, of which the renowned phonetician Daniel Jones (1881–1967) was the head. During World War II he was in charge of short intensive training courses in Japanese, which both depended on, and influenced, his linguistic outlook. Firth's was the first and only Chair of Linguistics in Britain until 1960, but his influence is reflected in the rapid growth of the subject in the 1960s and the fact that seven members of his academic staff subsequently held chairs themselves, three of them in other universities.

Firth's earlier works are collected in *Papers in Linguistics 1934–1951* (Firth 1957) and his later works, together with some papers unpublished at his death, in *Selected Papers of J. R. Firth 1952–1959* (Palmer 1968). A collection of original papers by Firth and his colleagues appeared under the title of *Studies in Linguistic Analysis* in 1962, while papers on prosodic analysis (see below) are reprinted in *Prosodic Analysis* (Palmer 1970). A summary of his own views was presented by him in 'A synopsis of linguistic theory 1952–55' (Palmer 1968 [1957]: 168–205). Other accounts of the theory are found in Robins (1963) and in the Introduction to Palmer (1968). For details of Firth's career see the obituary by Robins (1961).

Firth is probably best known for the work produced from 1948 until his death in 1960, but the work of the 'London School' includes the publications of his followers (almost all members of the department) from 1948 until the middle 1960s. His contribution can only be fully appreciated, however, in the light of his earlier works published in the years before the War. Most of his early publications, apart from two popular books *Speech* (1930) and *Tongues of Men* (1937; both reprinted in 1964), were mainly concerned with phonology, although 'The technique of semantics' (Firth 1957 [1935]: 7–33) lays the foundation for his basic theory. It was in the field of phonology that he provided the greatest stimulation, with development of the theory known as 'prosodic analysis' that stemmed from his 'Sounds and prosodies' (Palmer 1970 [1948]: 1–26), for most of the papers published by members of his department during the 1960s were on that topic.

1. Firth's Views on Meaning

A second theory with which Firth is closely associated is that of 'context of situation,' but this (and also, to some degree, prosodic analysis) are best understood in terms of his more general views on meaning. While his contemporary in the early years, Bloomfield, was suggesting that meaning was 'the weak point in language study' (Bloomfield 1933: 140), and later American linguists were to exclude it altogether, Firth was already developing his contextual theory of meaning, which is first clearly stated in 'The technique of semantics,' (Firth 1957 [1935]: 19) where he speaks of meaning as 'situational relations in a context of situation' and says 'I propose to split up meaning or function into a series of component functions. Each function will be defined as the use of some language form or element in relation to some context. Meaning, that is to say, is to be regarded as a complex of contextual relations, and phonetics, grammar, lexicography, and semantics each handles its own components of the complex in its own appropriate context.' (This he applied specifically to phonetics and phonology by distinguishing between the minor function of vowels, which was concerned only with phonetic context and the major functions, which were situational, lexical, morphological, and phonaesthetic (Firth 1957 [1935]: 37).) This, of course, involves a considerable reinterpretation of the notion of meaning; meaning defined 'in terms of actual situations' (Bloomfield 1935: 144) would relate to only one component. Firth's later exposition of his views in 'Personality and language in society' (Firth 1957 [1950]: 183) held that 'the statement of meaning cannot be achieved by one analysis at one level, in one fell swoop' and talked of linguistics being 'a sort of hierarchy of techniques by means of which the meaning of linguistic events may be, as it were, dispersed in a spectrum of specialized statements' ('rather like the dispersion of light of mixed wavelengths into a spectrum' (Firth 1957 [1951]: 192)). Context of situation is concerned with the 'social level of analysis' and forms the basis of the hierarchy of techniques for the statements of meaning (Firth 1957 [1951]: 183), but Firth could talk also about phonological and even phonetic meaning, with the comment 'surely it is part of the meaning of an American to sound like one' (ibid: 192, 194, 197).

2. Techniques and Abstractions

The title of the 1935 paper, 'Techniques of semantics,' is significant; it is concerned with techniques for language description, which, Firth later stated, consisted of 'a range of abstracted levels, that were not to be confused with Bloomfield's "levels of analysis".' (The term 'semantics' also is intended to refer to his theory; he talks of the integration of the work of the phonetician, grammarian, and lexicographer into experience and situation and wishes to use the term 'semantics' for that; but the term is, perhaps, a little unfortunate because it is also used in the paper in its narrower sense, and he did not use it again in his sense in his later papers.) In particular, there was no direction in the hierarchy of techniques: statements could be made at the different levels either in descending order, beginning with social context, or in the opposite order, beginning with phonetics (Firth 1957 [1951]: 192). Reference to abstraction ('abstracted levels') is also important: both the selection of the text and the operation of the techniques, involved 'abstractions' by the linguist (ibid). There were no '"facts" prior to statement' (Palmer 1968 [1957]: 199). Firth was, in this respect, firmly an empiricist; he had always insisted on a formal approach to grammar: 'No grammar without morphology' (Firth 1957 [1935]: 19) and dismissed any kind of mentalistic approach (Firth 1964 [1930]: 173; 1957 [1935]: 19) and he quoted with approval Wittgenstein's 'the meaning of words lies in their use' (Palmer 1968 [1957]: 179). He also emphasized theory rather than methodology: 'the excessive use of method and procedures is avoided so that theoretical relevance may not be hidden or obscured' (Palmer 1968 [1957]: 168), with particular scorn (in conversation at least) for the methodologies of phonemics with its 'additive' morphemics and 'corrective' morphophonemics (cf. Palmer 1968 [1955]: 40). This might not seem controversial today, when discovery procedures (Chomsky 1957: 51) are no longer in favor, but it gave Firth and his colleagues freedom to break with the dogmas of American structuralism and, in particular, to reject the rigid separation of levels (see *American Structuralism*).

3. Context of Situation

Nevertheless, as quotations above make clear, context of situation was 'a key concept' (Firth 1957 [1950]: 181) of Firth's theory of meaning. He acknowledged that he had taken this expression from the anthropologist Malinowski, with whom he had worked in London, and whose views on meaning are best-known from his 'The problem of meaning in primitive languages,' which is a supplement to Ogden & Richards's (1923) *The Meaning of Meaning* as well as his own (1935) *Coral Gardens and Their Magic*. Malinowski's views on language derived from the difficulties he had experienced in attempting to translate the texts that he had collected, and his conclusion that they could only be understood if placed in the contexts in which they had been uttered. Written language, he suggested, was not the norm, but a far-fetched derivative function of language; language was not a 'mirror of reflected thought,' but a 'mode of action' (1923: 296). Firth felt, however, that Malinowski's context of situation was 'a bit of the social process which can be considered apart,' that it was 'an ordered series of events considered *in rebus*,' whereas his own context of situation was an abstraction, 'a schematic construct,' 'a group of related categories at a different level from grammatical categories, but rather of the same abstract nature.' The categories, he suggested, were (1):

(a) The relevant features of participants: persons, personalities. (1)
    (i) The verbal action of the participants.
    (ii) The nonverbal action of the participants.
(b) The relevant objects.
(c) The effect of the verbal action.

Firth gives just one example, which represents 'a typical Cockney event' (2):

'Ahng gunna gi' wun fer Ber'' (2)
(I'm going to get one for Bert.)

'What,' Firth asks, 'is the minimum number of participants? Three? Four? Where might it happen? In a pub? Where is Bert? Outside? Or playing darts? What are the relevant objects? "Obvious!" you say. So is the convenience of the schematic construct called "context of situation"' (Firth 1957 [1950]: 182). In addition to these interior relations of the context, he later suggests that there should be reference to more general frameworks such as economic, religious, and other social structures, types of discourse (monologue, narrative, etc.), personal interchanges, and types of speech function such as drills and orders together with the social techniques of flattery, deception, etc. (Palmer 1968 [1957]: 178).

An obvious objection to this is that the technique would deal satisfactorily only with specialized situations, and would fail to account for the meaning of the vast majority of normal utterances. But from the beginning Firth had approached the problem by concentrating on 'common situations' (Firth 1957 [1935]: 30), and always stressed the importance of 'restricted languages' in which the utterances were closely associated with their situation. He would cite as a justification his success in training service personnel in a very short time to interpret Japanese messages during World War II, by recognizing the 'limited situational contexts of war' and their 'operative language' (Firth 1957 [1950]: 182). He did not hope to make a total statement of meaning 'at one fell swoop,' but was content to say what could be said by whatever technique was available. Yet the only paper that attempted, with some success, to put Firth's situational theory into practice is Mitchell's (1957) 'The language of buying and selling in Cyrenaica: a situational statement.' (On this point, and for a more general critique of the theory, see Lyons 1966.)

4. Collocation

One extra 'mode of meaning' that Firth introduced was that of 'collocation'; this is the topic of 'Modes of meaning' (Firth 1957 [1951]: 190–215), and is illustrated by the claim that part of the meaning of *ass* in modern colloquial English could be stated in terms of collocation in (3):

(a) An ass like Bagson might easily do that. (3)
(b) He is an ass.
(c) You silly ass!
(d) Don't be an ass!

One of the meanings of *ass*, then, is its habitual collocation with *you silly*; there are limited possibilities of collocation, the commonest adjectives being *silly*, *obstinate*, *stupid*, *awful*, and occasionally *egregious*. Firth further illustrated collocation from Lear's limericks, the poems of Swinburne, and letters of the eighteenth and early nineteenth century. He stressed that collocational meaning was not the same as contextual meaning, but also argued that context of situation was necessary for the statement of meaning by collocation to be completed. The notion of collocation may seem similar to that of distribution, a key notion in American structuralism, but, consistently with his general views on meaning, Firth was not concerned with the total distribution of words, but with these restricted co-occurrences, with what he called 'the mutual expectancy' of words, and also within restricted languages (Palmer 1968 [1957]: 180). After prosodic analysis, collocation is the topic that provided the most interest for other scholars who had worked with him or been indirectly influenced by him; three of the papers in his memorial volume (Bazell et al. 1966) are concerned with the subject (those by M. A. K. Halliday, J. McH. Sinclair, and T. F. Mitchell).

5. Structure and System

Within grammar and phonology, Firth laid great emphasis on the notion of syntagmatic and paradigmatic relations, as proposed by Saussure (1959 [1916]: 122–34) and developed by Hjelmslev (1953: 22–25) and the parallel distinction of structure and system, structures always being syntagmatic or 'horizontal,' systems being paradigmatic or 'vertical.' Within each system the units or terms were 'commutable' and received their value from their place within that system. Firth's approach was polysystemic, which meant that different systems could be set up within any one structure, and there was no identification between the terms of different systems. This is well-illustrated in (prosodic) phonology.

Within grammar, Firth illustrates his views by suggesting that a nominative in a four-case system would have a different meaning from a nominative in a two-case or in a fourteen-case system, and that a singular in a two-number system would have a different meaning from a singular in a three-number system or a four-number system such as that of Fijian with its singular, dual, 'little' plural and 'big' plural, and that the meaning of the grammatical category noun would be different in a system of noun, verb, and particle from its meaning in a five-term system in which adjective and pronoun are formally distinct from noun (Firth 1957 [1951]: 227). The grammatical elements of structure were linked by colligation, with, as for collocation, mutual expectation (Palmer 1968 [1957]: 186) between them. These notions of system and structure were adopted by Halliday as a central part of his Systemic Grammar (for early references see Halliday 1962: 254–55, 263–64; Halliday et al. 1964: 29–30; see also *Systemic Theory*).

6. Grammar

Unfortunately, Firth has very little else of real significance on grammar, although there are interesting observations on the grammars of languages, particularly English, in several of his papers. He emphasized the need for grammar to be formal (Firth 1957 [1951]: 222), rejecting the idea of universal grammatical categories, and insisted on the abstract nature of the grammatical elements. For that reason, he argued that the *order* of the grammatical categories 'is very different from the successivity of bits and pieces in a unidirectional time sequence' (Palmer 1968 [1957]: 173). Grammatical categories are abstracted from the linguistic material, but 'renewal of connection' via their 'exponents' is essential, though these exponents may be discontinuous or cumulative (ibid.: 190). This issue is discussed in some detail by Palmer (1964). In one paper specifically on the subject, 'A new approach to grammar' (Palmer 1968: 114–24), he confirms his opposition to dualist theories of meaning and his insistence that grammar is concerned with abstract categories, not words or morphemes, and he suggests that grammatical analysis should first be applied to restricted languages, but the only new idea is in the extension of his 'spectrum' theory of meaning, by suggesting that grammar too should be 'dispersed,' with a series of congruent levels 'such as graphematics, phonology, morphematics, and syntax.'

In his last years Firth devoted much attention to translation (there are two papers in Palmer 1968). This was, in a way, appropriate, since his theoretical views had their origins in the problems that Malinowski had faced.

Anyone who reads Firth's work will inevitably be frustrated. Much of it is programmatic and sometimes unclear and apocryphal, and there is a great deal of repetition in successive papers. Yet it is, and was, stimulating, and offered a whole generation of scholars in the UK a new insight into language study, as well as providing an alternative to the barren structuralism of his time. If some of it appears obvious today, it may be that he was ahead of his time.

Bibliography

Bazell C E, Catford J C, Halliday M A K, Robins R H (eds.) 1966 *In Memory of J. R. Firth*. Longman, London

Bloomfield L 1933 *Language*. Holt, New York

Chomsky N 1957 *Syntactic Structures*. Mouton, The Hague

Firth J R 1957 *Papers in Linguistics 1934–1951*. Oxford University Press, London

Firth J R 1964 *The Tongues of Men and Speech*. Oxford University Press, London

Halliday M A K 1962 Categories of the theory of grammar. *Word* **17**: 241–92

Halliday M A K, McIntosh A, Strevens P 1964 *The Linguistic Sciences and Language Teaching*. Longman, London

Hjelmslev L 1953 *Prolegomena to a Theory of Language. International Journal of American Linguistics Memoir 7* (Transl. Whitfield F J) IJAL, Bloomington, Indiana

Lyons J 1966 Firth's theory of 'meaning.' In: Bazell et al. (eds.) 1966

Malinowski B 1923 The problem of meaning in primitive languages. Supplement to Ogden C K, Richards I A 1923 *The Meaning of Meaning*. Kegan Paul, London

Malinowski B 1953 *Coral Gardens and Their Magic, II*. Allen & Unwin, London

Mitchell T F 1957 The language of buying and selling in Cyrenaica: A situational statement. *Hespéris* **1957**: 31–71

Palmer F R 1964 'Sequence' and 'order.' In: Stuart C I J M (ed.) Report of the *15th Annual R. T. M. on Linguistic and Language Studies* (*Monograph Series on Languages and Linguistic Series* **17**)

Palmer F R (ed.) 1968 *Selected Papers of J. R. Firth, 1952–1959*. Longman, London

Palmer F R (ed.) 1970 *Prosodic Analysis*. Oxford University Press, London
Philological Society 1962 *Studies in Linguistic Analysis*. Blackwell, Oxford
Robins R H 1961 John Rupert Firth. *Language* **37**: 191–200
Robins R H 1963 General linguistics in Great Britain 1930–1960. In: Mohrmann C, Norman F, Sommerfelt A (eds.) *Trends in Modern Linguistics*. Spectrum, Antwerp
Saussure F de 1916 *Cours de linguistique générale*. Payot, Paris (Transl. by Baskin W 1959 as *Course in General Linguistics*. McGraw-Hill, New York)

Systemic Theory

M. A. K. Halliday

1. Origins of Systemic Theory

Systemic, or systemic–functional, theory has its origin in the main intellectual tradition of European linguistics that developed following the work of Saussure. Like other such theories, both those from the mid-twentieth century (e.g., Prague school, French functionalism) and more recent work in the same tradition (e.g., that of Hagège), it is functional and semantic rather than formal and syntactic in orientation, takes the text rather than the sentence as its object, and defines its scope by reference to usage rather than grammaticality. Its primary source was the work of J. R. Firth and his colleagues in London (see *Firth and the London School of Linguistics*). As well as other schools of thought in Europe such as glossematics it also draws on American anthropological linguistics, and on traditional and modern linguistics as developed in China.

Its immediate source is as a development of scale and category grammar. The name 'systemic' derives from the term 'system,' in its technical sense as defined by Firth (1957); system is the theoretical representation of paradigmatic relations, contrasted with 'structure' for syntagmatic relations. In Firth's system–structure theory, neither of these is given priority; and in scale and category grammar this perspective was maintained. In systemic theory the system takes priority; the most abstract representation at any level is in paradigmatic terms. Syntagmatic organization is interpreted as the 'realization' of paradigmatic features.

This step was taken by Halliday in the early 1960s so that grammatical and phonological representations could be freed from constraints of structure. Once such representations were no longer localized, they could function prosodically wherever appropriate. The shift to a paradigmatic orientation added a dimension of depth in time, so making it easier to relate language 'in use' to language being learnt; and it enabled the theory to develop both in reflection and in action—as a resource both for understanding and for intervening in linguistic processes. This potential was exploited in the work done during the 1960s on children's language development from birth through their various stages of schooling.

2. Systems and Their Realization

The organizing concept of a systemic grammar is that of choice (that is, options in 'meaning potential'; it does not imply intention). A system is a set of options together with a condition of entry, such that if the entry condition is satisfied one option, and one only, must be chosen; for example, in English grammar, [system] 'mood,' [entry condition] finite clause, [options] indicative/imperative. The option selected in one system then serves as the entry condition to another; e.g., [entry condition] indicative, [options] declarative/interrogative; hence all systems deriving from a common point of origin (e.g., [clause]) are agnate and together form a 'system network.' At the present stage of development, system networks for English grammar in computational form contain about 1,000 systems. An entry condition may involve the conjunction of different options; hence a system network is not a taxonomic structure but has the form of a lattice.

The system has one further component, namely the 'realization statement' that accompanies each option. This specifies the contribution made by that option to the structural configuration; it may be read as a proposition about the structural constraints associated with the option in question. Realization statements are of seven types:

(a) 'Insert' an element (e.g., insert subject);
(b) 'Conflate' one element with another (e.g., conflate subject with theme);
(c) 'Order' an element with respect to another, or to some defined location (e.g., order finite auxiliary before subject);
(d) 'Classify' an element (e.g., classify process as mental : cognition);
(e) 'Expand' an element into a further configuration (e.g., expand mood into subject + finite);

(f) 'Preselect' some feature at a lower rank (e.g., preselect actor : human collective); and
(g) 'Lexify' an element (e.g., lexify subject : *it*).

When paths are traced through a system network, a 'selection expression' is formed consisting of all the options taken up in the various functional components. As the network is traversed, options are inherited, together with their realizations; at the same time, new realization statements continue to figure throughout. The selection expression constitutes the grammar's description of the item (e.g., the particular clause so specified); it is also, by reference to the network, the representation of its systemic relationship to other items in the language—since the grammar is paradigmatic, describing something 'consists in' locating it with respect to the rest (showing its total lineage of agnate forms).

3. Other Basic Concepts

Systemic theory retains the concepts of 'rank,' 'realization,' and 'delicacy' from scale and category grammar. 'Rank' is constituency based on function, and hence 'flat,' with minimal layering; 'delicacy' is variable paradigmatic focus, with ordering from more general to more delicate; 'realization' (formerly 'exponence') is the relation between the 'strata,' or levels, of a multistratal semiotic system—and, by analogy, between the paradigmatic and syntagmatic phases of representation within one stratum. But in systemic theory, realization is held distinct from 'instantiation,' which is the relation between the semiotic system (the 'meaning potential') and the observable events, or 'acts of meaning,' by which the system is constituted.

The shift to a paradigmatic orientation led to the finding that the content plane of a language is organized in a small number of functionally defined components which Halliday labeled 'metafunctions.' According to this theory the grammar of natural languages evolved in simultaneously (a) 'construing' human experience (the 'experiential' metafunction) and (b) 'enacting' interpersonal relationships (the 'interpersonal' metafunction), both these being underpinned by (c) the resources of (commonsense) logic (the 'logical' metafunction; (a) and (c) are grouped together as 'ideational'). The stratal role of the lexicogrammar lies in mapping these semantic components into a unitary construct, one that is capable of being linearized; in doing this, the grammar (d) 'creates' its own parallel universe in the form of discourse (the 'textual' metafunction). These metafunctions define the dimensions of semantic space; and since they tend to be realized by different structural resources—experiential meanings segmentally, interpersonal meanings prosodically, logical meanings in iterative structures, and textual meanings in wave-like patterns—they also determine the topological formations that are characteristic of human speech.

A systemic grammar is therefore 'functional' in three distinct though related senses:

(a) Its 'explanations' are functional: both the existence of grammar (why grammar evolved as a distinct stratum), and the particular forms that grammars take, are explained in terms of the functions that language evolved to serve.
(b) Its 'representations' are functional: a structure is an organic configuration of functions, rather than a tree with nodes labeled as classes.
(c) Its 'applications' are functional: it developed as an adjunct to practices associated with language use, requiring sensitivity to functional variation in language ('register' variation). These considerations both relate it to, and at the same time distinguish it from other functional theories.

4. Other Features of the Theory

Like the Firthian linguistics from which it evolved, systemic theory is oriented towards language as social process; the individual is construed intersubjectively, through engagement in social acts of meaning. This is not incompatible with a cognitive perspective, which has been adopted in some systemic work (notably Fawcett 1980); but it does rule out any claim for 'psychological reality.' Halliday formulated this general stance as 'language as social semiotic,' thereby also locating systemic theory in the thematic context of semiotics, defined as the study of systems and processes of meaning. The relation between language and other sociocultural phenomena is then modeled on that of realization (the perspective here is Firthian rather than Hjelmslevian): language 'realizes' culture in the way that, within language, sound realizes wording, and the realization of wording in sound, in its turn, realizes meaning.

It follows from this that systemic theory gives prominence to discourse, or 'text'; not—or not only—as evidence for the system, but valued, rather, as constitutive of the culture. The mechanism proposed for this constitutive power of discourse has been referred to as the 'metafunctional hookup': the hypothesis that (a) social contexts are organic–dynamic configurations of three components, called 'field,' 'tenor,' and 'mode': respectively, the nature of the social activity, the relations among the interactants, and the status accorded to the language (what is going on, who are taking part, and what they are doing with their discourse); and (b) there is a relationship between these and the metafunctions such that these components are construed, respectively, as experiential, as interpersonal, and as textual meanings. Register, or functional variation in language, is then interpreted as systemic variation in the relative prominence (the probability of being taken up) of different options within these semantic components.

In fact such register variation (spoken/written, commonsense/technical, transactional/expository, . . . and so on) lies on the continuum between system and text; the characteristic of systemic work is that it brings all parts of this continuum under focus of attention. Analogously, it encompasses both speaker and listener perspectives (in computational terms, text generation, and parsing—there are, for example, no nonrecoverable operations such as deletion), and both synoptic and dynamic orientations; and uniquely among current theories, it assigns as much value to interpersonal and textual meaning as to ideational. On the other hand, in other respects systemic work is notably ill-balanced; there has been little study of morphology and phonology, and a disproportionate amount of research relates to English. These reflect on the one hand the contexts of its own development, especially the kinds of application for which it has been sought out; and on the other hand its requirement of comprehensiveness, demanding a coverage which is at once both broad and deep.

5. Development of Systemic Theory

The outlines of systemic theory were formulated in London in the 1960s by Halliday together with Huddleston, Hudson, and others, and in application to Bernstein's work by Hasan, Mohan, and Turner; other significant input came from the application of systemic concepts in curriculum development work, in the analysis of scientific writings and of natural conversation, and in descriptions of a number of Asian and African languages. The theory was further developed in the 1970s: by Fawcett, Berry, and Butler in the United Kingdom; by Halliday and Hasan; and by Gregory and his colleagues in Toronto. Since 1980 systemic work has expanded considerably in various directions (e.g., in artificial intelligence, child language development, discourse analysis and stylistics, and language education). It is typical of systemic practice that major extensions both to description and to theory have taken place in these 'applied' contexts: for example, the very large systemic grammars of English that now exist in computational form (PENMAN 'Nigel'; COMMUNAL), and the extensive studies of children's writing and of the language of educational texts in science, history, and other subjects that have been carried out by Martin and his colleagues in contexts such as the New South Wales Disadvantaged Schools Program.

Since 1980, further studies have been devoted to languages other than English, notably Chinese (Fang; Hu; Long; McDonald; Ouyang; Zhang; Zhao; Zhu), French (Caffarel), Indonesian (Sutjaja; Wirnani), and Tagalog (Martin); and work in text generation has begun to take in Chinese and Japanese (Matthiessen et al.) and German, French, and Dutch (Bateman; Steiner). In English, Halliday's *Introduction to Functional Grammar* brought together some of his studies begun in the late 1960s (1967/68); and advances were made in all areas of the grammar: experiential (Davidse; Martin), interpersonal (Butler; Thibault), and textual (Fries; Hasan; Matthiessen). Matthiessen (1995) presented a system-based account of English grammar, deriving from materials he had written to accompany the 'exporting' of the Nigel grammar.

Many general theoretical discussions have appeared (Fawcett; Halliday; Lemke, etc.), as well as new theoretical underpinning of key areas, especially lexicogrammar, discourse semantics, and text structure (Matthiessen; Martin; Berry; Hasan, etc.). Matthiessen's (1992) account of register theory emphasizes the integrative character of systemic work: while there are often alternative interpretations, especially where new problems are being addressed, these are not detached from their overall context in language and in linguistics. Thus there is no disjunction between grammar and discourse, or between the system and the text.

With the strengthening of what Halliday calls the 'grammatics' (that is, theory of grammar as metatheoretic resource), systemic writings have increasingly foregrounded the constructive power of grammar; this is reflected in numerous studies which began with the 'critical linguistics' of the late 1970s (Fowler et al.; Kress & Hodge; subsequently Butt; Hasan; Kress; Lemke; Martin; McGregor; O'Toole; Thibault; Threadgold; cf. Threadgold et al. 1986, and the new journal *Social Semiotics*). In a large-scale investigation of natural conversation between mothers and their preschool children, Hasan & Cloran (1990) have developed semantic networks to explore the effects of social factors on children's learning styles, and their consequences for education. Martin's work on register and genre (1992) extends the constructivist model of language to include strata of genre and ideology. It is in this overall perspective that language becomes central to the educational initiatives of Martin, Rothery, Christie, and others in Australia; compare also the work of Carter, et al. in the LINC ('Language in the National Curriculum') program in the United Kingdom.

In 1974 Fawcett organized the first systemic workshop, at the West Midlands College of Education, with 16 participants from four centers in the UK. Since then the workshop has been an annual event; the first international workshop was the ninth, held in Toronto (York University) in 1982. In the 1990s, now as 'International Systemic Functional Congress,' meetings have been held in Scotland (Stirling, 1990), Japan (International Christian University, 1991), Australia (Macquarie, 1992), Canada (British Columbia, 1993), Belgium (Ghent, 1994) and China (Peking, 1995); and regular national or international seminars/workshops are held in China, in Australia and in different countries of Europe. The publication *Network* provides information on these activities, along with short articles, reviews, bibliographies and conference reports. The regularly updated bibliographical database now contains more than 1,000 books and articles. Selected conference papers from 1983, 1985, 1986 and from 1988 onwards have appeared, or are appearing, in published form (see *Bibliography*).

6. Influences and Trends

In the period from its inception in the early 1960s the main influences on systemic theory (other than those coming in via specific applications such as computational linguistics) have come from Lamb's work in stratificational grammar (see *Stratificational Grammar*) and from Sinclair's in discourse and in lexical studies. Lamb and Halliday collaborated regularly over a number of years. Sinclair had been an originator of scale and category grammar and his subsequent work exploited this, though in a complementary direction to Halliday's: Sinclair builds the grammar out of the lexis, whereas Halliday builds the lexis out of the grammar. Other input has come from Labov's quantitative methodology (though not his general perspective on language and society); from the theory and practice of corpus linguistics (Quirk; Svartvik, et al.; more recently Sinclair); from other work in functional linguistics (especially Thompson); and from poststructuralist semiotics in general.

A feature of systemic work is that it has tended to expand by moving into new spheres of activity, rather than by reworking earlier positions. This reflects an ideological perspective in which language is seen not as unique or *sui generis* but as one aspect of the evolution of humans as sociocultural beings. Thus input often comes from outside the discipline of linguistics: from current theories in fields such as anthropology, literature, and neurology, and from developments in more distant sciences. Much systemic linguistics reflects transdisciplinary rather than disciplinary thinking in its approach to problems of language.

This orientation appears in some present trends and likely future directions. For example:

(a) systemic grammatics as model for other semiotic systems, especially forms of art: not only literature (Butt; O'Toole; Thibault; Threadgold) but also music (van Leeuwen; Steiner), visual imagery (Kress & van Leeuwen), and painting, architecture, and sculpture (O'Toole, 1994);

(b) further developments of register theory to investigate the linguistic construction of knowledge and structures of power;

(c) using available corpus data and programs to test hypotheses about the probabilistic properties of systems (Nesbitt & Plum; Halliday & James);

(d) further development of language-based educational programs, in initial literacy, secondary 'subjects,' teacher education, language in the workplace, etc;

(e) natural language processing: modeling systems of meaning (knowledge systems); developing integrated generation and parsing programs, including multilingual ones; and processing language in 'intelligent fuzzy computing' (Sugeno);

(f) further work in deaf sign (Johnston) and development of systemic research in neurolinguistics and the discourse of aphasia, dementia, etc; and

(g) greater emphasis on studies of the expression plane in a general systemic context.

Just as systemic theory is itself a variant of a broader class of theories (functional theories, perhaps with 'system-structure theories' as an intermediate term), so it itself accommodates considerable variation. Gregory's 'communication linguistics' foregrounds structures of knowledge and presents a dynamic 'phase and transition' model of discourse; Fawcett's computational modeling contrasts in various ways with that of Matthiessen and Bateman; Martin's register theory, with genre as a distinct stratum, contrasts with Hasan's view of register as functional variation realizing different values of contextual variables. This kind of variation in 'metaregister' is one of many ways in which systemic theory appears as a metaphor for language itself.

The standard introduction to systemic linguistics has been Berry (1976/77). Other introductory or summary works are Monaghan (1979), Halliday & Martin (1981), Butler (1985), Morley (1985), and, an original work in Chinese, Hu et al. (1989). The extensive series of publications emanating from the New South Wales Disadvantaged Schools Program is an excellent source for systemic grammar of English in an educational context (see bibliography at end of Martin's paper in Halliday 1993). Further introductory books from the mid-1990s include Eggins (1994), Butt et al. (1995), Matthiessen (1995), Martin et al. (1996) and Bloor & Bloor (1995).

Bibliography

Benson J D, Cummings M J, Greaves W S (eds.) 1988 *Linguistics in a Systemic Perspective*. Benjamins, Amsterdam

Berry M 1975/77 *Introduction to Systemic Linguistics. Vol. 1: Structures and Systems. Vol. 2: Levels and Links*. Batsford, London

Berry M (ed.) 1984 *Nottingham Linguistic Circular 13*, Special Issue in Systemic Linguistics. University of Nottingham, Nottingham

Bloor T, Bloor M 1995 *The Functional Analysis of English: A Hallidayan Approach*. Arnold, London

Butler C S 1985 *Systemic Linguistics: Theory and Applications*. Batsford, London

Butt D, Fahey R, Spinks S, Yallop C 1995 *Using Functional*

Grammar: An Explorer's Guide. NCELTR, Macquarie University, Sydney

Eggins S 1944 *An Introduction to Systemic Functional Linguistics*. Pinter, London

Fawcett R P 1980 *Cognitive Linguistics and Social Interaction: Towards an Integrated Model of a Systemic Functional Grammar and Other Components of a Communicating Mind*. Julius Groos, Heidelberg

Firth J R 1957 A synopsis of linguistic theory 1930–55. In: *Studies in Linguistic Analysis*, Special Volume of the Philological Society. Blackwell, Oxford

Halliday M A K 1967/68 Notes on transitivity and theme in English, Parts 1–3. *Journal of Linguistics* **3(1)**: 37–81, **3(2)**: 199–244, **4(2)**: 179–215

Halliday M A K 1978 *Language as Social Semiotic: The Social Interpretation of Language and Meaning*. Arnold, London

Halliday M A K (ed.) 1993 *Language as Cultural Dynamic* (*Cultural Dynamics* 6.1–2). Brill, Leiden

Halliday M A K 1994 *An Introduction to Functional Grammar*, 2nd edn. Arnold, London

Halliday M A K, Fawcett R P (eds.) 1987 *New Developments in Systemic Linguistics. Vol. 1: Theory and Description*. Pinter, London

Halliday M A K, Martin J R (eds.) 1981 *Readings in Systemic Linguistics*. Batsford, London

Halliday M A K , Martin J R 1993 *Writing Science: Literacy and Discursive Power*. Falmer, London

Halliday M A K, Matthiessen C 1996 *Construing Experience through Meaning: A Language-based Approach to Cognition. Foundations of Communication and Cognition*. de Gruyter, Berlin

Hasan R, Cloran C 1990 A sociolinguistic investigation of everyday talk between mothers and children. In: Halliday M A K, Gibbons J, Nicholas H (eds.) *Learning, Keeping and Using Language: Selected Papers from the Eighth World Congress of Applied Linguistics, Sydney, August* 1987. Benjamins, Amsterdam

Hasan R, Martin J R (eds.) 1989 *Language Development: Learning Language, Learning Culture*. Ablex, Norwood, New Jersey

Hu Zhuanglin, Zhu Yongsheng, Zhang Delu 1989 *A Survey of Systemic Functional Grammar* (in Chinese). Hunan Educational Publishing House, Changsha

Hudson R A 1971 *English Complex Sentences*. North Holland, Amsterdam

Kress G R (ed.) 1976 *Halliday: System and Function in Language: Selected Papers*. Oxford University Press, Oxford

Martin J R 1992 *English Text: System and Structure*. Benjamins, Amsterdam

Martin J R, Matthiessen C, Painter C 1996 *Deploying Functional Grammar: A Workbook for Halliday's Introduction to Functional Grammar*. Arnold, London

Matthiessen C 1992 Register in the round: Diversity in a unified theory of register analysis. In: Ghadessy M (ed.) *Register Analysis*. Pinter, London

Matthiessen C 1995 *Lexicogrammatical Cartography: English Systems*. International Language Sciences Publishers, Tokyo

Matthiessen C, Bateman J 1991 *Text Generation and Systemic Linguistics: Experiences from English and Japanese*. Pinter, London

Monaghan J 1979 *The Neo-Firthian Tradition and its Contribution to General Linguistics*. Niemeyer, Tübingen

Morley G 1985 *An Introduction to Systemic Grammar*. Macmillan, London

O'Toole M 1994 *The Language of Displayed Art*. Leicester University Press (Pinter), London

Tench P (ed.) 1992 *Studies in Systemic Phonology*. Pinter, London

Threadgold T, et al. (eds.) 1986 *Semiotics, Ideology, Language*. Sydney Association for Studies in Society and Culture, Sydney

Special Publications

Bibliography: Halliday M A K, Matthiessen C 1985 *Bibliographic Data Base for Systemic Linguistics*. Macquarie University, Sydney

Newsletter: Matthiessen C 1980 *Network: News, Views and Reviews in Systemic Linguistics and Related Areas*. Macquarie University, Sydney

Occasional papers: Hillier H 1984 *Occasional Papers in Systemic Linguistics*. University of Nottingham, Nottingham

Journal: Functions of Language 1994. Benjamins, Amsterdam

Monograph series: Monographs in Systemic Linguistics 1991. University of Nottingham, Department of English Studies, Nottingham

Papers from Workshops/Congresses

Benson J D, et al. (eds.) 1989 *Systems, Structures and Discourse. Word* **40**: 1–2

Benson J D, Greaves W S (eds.) 1985 *Systemic Perspectives on Discourse*, vols. 1 & 2. Ablex, Norwood, New Jersey

Benson J D, Greaves W S (eds.) 1988 *Systemic Functional Approaches to Discourse*. Ablex, Norwood, New Jersey

Davies M, Ravelli L (eds.) 1992 *Advances in Systemic Linguistics: Recent Theory and Practice*. Pinter, London

Halliday M A K, Peng F C C (eds.) 1992 *Current Research in Functional Grammar* (*Language Sciences* 14.4). Pergamon, Oxford

Hasan R, Cloran C, Butt D (eds.) 1995 *Functional Descriptions*. Benjamins, Amsterdam

Hasan R, Fries P H (eds.) 1995 *On Subject and Theme: A Discourse Functional Perspective*. Benjamins, Amsterdam

Hasan R, Williams G (eds.) 1996 *Literacy in Society*. Longman, London

Steiner E, Veltman R (eds.) 1988 *Pragmatics, Discourse and Text: Explorations in Systemic Semantics*. Pinter, London; Ablex, Norwood, New Jersey

Ventola E (ed.) 1991 *Functional and Systemic Linguistics: Approaches and Uses*. Mouton de Gruyter, Berlin

Guillaumean Linguistics

John Hewson

There are only two instances in the twentieth century of a linguist's lecture notes being published because of their importance and lasting value. One was, of course, Saussure; the other is Gustave Guillaume, whose multivolume *Leçons de linguistique* is still appearing 30 years after his death, and whose *Principes de linguistique théorique* has already been translated into half a dozen different languages.

Guillaume became a disciple of Antoine Meillet, and in later years often referred to 'mon maître Meillet,' quoting with approval Meillet's famous phrase 'une langue est un système où tout se tient,' which was a fundamental guiding principle of his work. In this quote we can see the influence of Saussure, since as Stefanini noted (1973: 322): 'L'idée que la langue est un système a toujours été considérée par toute l'école de Paris, de Meillet à Benveniste, comme l'apport fondamental de Saussure'.

Guillaume's first major publication was *Le Problème de l'article* (1919), the first extensive examination of the historical evolution and function of definite and indefinite articles, especially in French. The book was awarded the Prix Volney, and provided a substantial springboard to later studies on articles and definiteness such as Christophersen (1939), Hewson (1972), Chesterman (1991). In this volume the articles are seen as actualizers, operating upon the *nom en puissance* or underlying noun (potential noun) to produce the *nom en effet*, the surface noun phrase (actualized noun) which could thereby become a concrete representation suitable for use in a sentence. The *nom en puissance* is the permanent possession of the speaker, stored in tongue (*langue*), out of awareness; the *nom en effet* is the momentary representation for a given sentence, produced for the purposes of discourse (*discours*, which he uses instead of *parole*). Already in 1919 this is a thoroughly cognitive approach.

Even at this stage, in fact, there is implicit in his work the notion of language being not a thing but an activity: the operation of producing discourse, which is ephemeral, by exploiting the possibilities provided by an underlying tongue, a permanent acquisition, learned by the child and maintained throughout life. Discourse is made to vibrate upon the air waves and is lost, but the tongue that people learn as children remains a permanent lifetime possession. These two different facets are seen as the beginning and the end of the act of language: the means of production, *langue* (tongue), and the product, *discours* (discourse).

In 1929, with the publication of *Temps et verbe*, he takes this point of view a step further, declaring in a now famous footnote on page 8: 'La pensée en action de langage exige réellement du temps' (Thought engaged in language activity requires real time), a principle that he would often in later years express in the dictum: 'Il faut du temps pour penser comme il faut du temps pour marcher' (Time is needed for thinking just as it is for walking). The result is the view, worked out in detail in the 1929 book, that many linguistic forms are the result of a cognitive processing that can be analyzed and reconstructed by the results that it produces, just as protolanguages can be analyzed and reconstructed by the results produced in a range of daughter languages. As a disciple of Meillet, he was well aware that reconstruction by the comparative method is a classic example of the proper functioning of theoretical method in linguistics, and an exemplary demonstration of how systems can be reconstructed by examining their systematic results (see Valin 1964).

Temps et verbe contains, in fact, a sketch of the content system of the French verb, an outline that Guillaume would continue to teach and to polish for the rest of his life. There were also thumbnail sketches of other verbal systems, and two of these, Latin and Greek, were later developed in a separate volume of their own (1945). The work has also inspired the analyses of others (Hirtle 1967, 1975; Molho 1975).

Subsequent to the death of Meillet, Guillaume was appointed to a teaching position at the Ecole des Hautes Etudes in Paris in 1938, where he continued to teach until his death at the age of 76 in February 1960. In some years there was one class a week, in others two, and for a few brief years three, and he spent this period developing his view of the act of language, the cognitive activity of the speaker in the development of discourse, a study to which he gave the name of *psychomécanique du langage* (psychomechanics of language). During these 22 years he developed a faithful clientele who attended regularly year after year, intrigued by the opportunity to watch a remarkable mind at work. During the last decade of his life his ideas began to be disseminated by some of those that he had influenced, notably Gerard Moignet (1912–78), Jean Stefanini (1917–85), and Maurice Molho in France, and Roch Valin in Canada. He was also supported by the approbation of scholars such as Michel Lejeune (b.1907), Robert-Léon Wagner (1880–1962), and Paul Imbs (1908–87).

On his death he left all his papers, which included two unpublished monographs, various unfinished articles, and the draft text of every lecture given at the Hautes Etudes, to Roch Valin, who transported them (60,000 manuscript pages) to Canada and founded the Fonds Gustave Guillaume at Laval University in Quebec City as a research center in psychomechanics. In the next decade most of these manuscript papers were transcribed, and in the 1970s the publication of the posthumous *Leçons de linguistique* began, with the collaboration of the Presses de l'Université Laval first of all with Klincksieck in Paris, and later with the Presses Universitaires de Lille. This latter collaboration was at the instigation of André Joly, who, after the death of Moignet and Stefanini, became the principal protagonist of Guillaumian ideas in France. By 1996 twelve volumes had been published, along with a volume of excerpts of some of the most interesting and typical passages from the manuscripts, entitled *Principes de linguistique théorique* (1973) which was subsequently translated into English (1984) as *Fundamentals for a Science of Language*.

Each volume contains the lectures for a given course, which would occupy one hour a week during the academic year of the French universities from November to June, normally some 25 hours of class. Each volume contains a set of editorial résumés of each lecture, and the more recent ones also have a substantial index, making it possible to trace the different ideas that are discussed and dealt with. Eight of the ten volumes published concern the grammar of French, one (vol. 2) is on the principles and methods of psychomechanics, and another (vol. 5) is on typological evolution, presenting what Guillaume called the *théorie des aires* or theory of mental spaces (*aires* = *areas*). Given that the earliest kind of language was necessarily holophrastic, where all the cognitive processing of the sentence goes on within the mental space of the word, there has been much linguistic evolution that results in providing words that are prefabricated, rather than fabricated piece by piece in the act of language.

Guillaume consequently has much to say about the genesis of the word in the act of language, and also about the relationship of one word to another in the theory of incidence, which is a very interesting development of traditional dependency theory, such as promoted by Jespersen (1924). Incidence can be either internal (Jespersen's primary) or external, and if external, either of the first degree (Jespersen's secondary) or second degree (Jespersen's tertiary). An adjective, for example, is incident to its noun: this is external incidence of the first degree. An adverb may be incident to the adjective that is incident to the noun; this is external incidence of the second degree. But a noun has no external incidence, and Guillaume is the first to observe that the noun has internal incidence or internal dependency. Jespersen was able to define a tertiary as that element that is dependent upon a secondary, and a secondary as that element that is dependent upon a primary, but Jespersen had grave difficulties in attempting to define a primary, and finds it difficult to talk any more exactly about nouns and adjectives than to say 'substantives are more special than adjectives, they are applicable to fewer objects than adjectives' (1924: 75).

An alternative way of presenting the theory of incidence is to say that in the noun phrase *very short day* the noun *day* is the support of the incidence of the adjective *short*, and that the adjective *short*, while supported by the noun, is in turn the support of the incidence of the adverb *very*. But the noun *day* has no external incidence: the noun as a part of speech *incorporates* what it characterizes. This remarkable insight into the grammar of dependencies constitutes an important breakthrough in the understanding of the cognitive operations of dependency syntax.

Stemming from his early work on the articles, in fact, Guillaume maintained a lifelong interest in the structure of the noun phrase and in its cognitive genesis. In the late 1940s, for example, he was teaching that the article is a completive pronoun that represents the third person element characterized by the lexeme of the noun. Part of the function of the article, in short, is to represent the cognitive element that is the support of the internal incidence of the noun.

Another lifelong interest that emerges in the *Leçons de linguistique* is the cognitive structure of the verb phrase. Already in *Temps et verbe* (1929) he had seen that in the French verbal system the subjunctive was necessarily a temporal representation that was less complete than that of the indicative, and consequently, in terms of the cognitive operations of the system, anterior to the indicative. A subjunctive represents an event that is not yet allocated to experiential time: the English subjunctive, for example, is tenseless: *I insist/insisted he be on time*. An indicative, on the other hand, not only represents the event but also represents it as occurring in experiential time, past, present, or future. The subjunctive representation, in this view, is made into an indicative representation by the addition of the element of universe time (1):

Subjunctive = representation of the event
Indicative = representation of the event
in universe time. (1)

In terms of cognitive processing, therefore, the subjunctive precedes the indicative.

He also distinguished tense, which represents universe time, past, present, and future, from aspect, which represents event time, the time for the event to unroll. Aspects typically represent the event as not yet started, just beginning, in the middle of the action, at the end of the action, or after the action has ended. In this respect French *j'ai parlé* and English *I have spoken* are both perfective aspects of the present tense, and only represent the past because any event that is already over in the present must have taken place in the past. By such mechanisms aspectual forms can be used to represent both past and future, but are not to be confused with the kind of representation that is achieved by tense.

Another important distinction made by Guillaume is that between 'simple expression' and 'expressivity.' Certain information, for example, is conveyed entirely by regular morphosyntactic means (simple expression) whereas other information is added by unusual orderings, stress, and intonation (expressivity). In French, for example, where the adjective may be either preposed or postposed, there is a difference of meaning between *pauvre homme* and *homme pauvre* which is a difference of expression. For both of these phrases the expression system of English has only *poor man*, but English compensates in expressivity by stressing the noun to translate the preposed adjective and stressing the adjective to translate the postposed adjective.

Syntax in psychomechanics is seen as a development and extension of the system of incidences, guided by semantic and pragmatic factors. Sentences can be treated as primaries, secondaries, and tertiaries, thereby creating noun clauses, adjectival (i.e., relative) clauses, and adverbial clauses. The verb is seen as dependent on its subject in Indo-European languages, in harmony with the view of Jespersen, and in contradiction to the view of Tesnière, who erroneously included the subject in the valency of the verb, which determines the direct object in these languages, and is a semantic rather than a grammatical question: the lexical sense of some verbs makes a direct object almost impossible, whereas others can have both direct and indirect objects. Even Generative Grammar, which does not recognize subject and object as meaningful roles in I-E languages, acknowledges their entirely different roles.

An important determining factor in syntax is the *visée de discours* or discursive intent, the intention of the speaker to give a linguistic representation to some aspect of experience, to create discourse that will express what the speaker 'has in mind.' It is this discursive intent that will determine whether a given clause is going to be active or passive, whether a noun or pronoun will be used for a subject, and so on. Again the fundamentally cognitive point of view can be noted, often roundly condemned as 'mentalistic' and 'untestable' by Guillaume's contemporaries, who were unwilling to face the fact that the speaker plays an imaginative and creative role in the construction of discourse, and unable to accommodate such a role within their limited scientific perspective. Linguistics, as a human science, is different from the physical sciences in that the free choice of the speaker, as a creator of discourse, has to be taken into account. André Joly (1987) has further pursued this emphasis upon the cognitive operations of the speaker, relating such studies to other French work on *énonciation* (enunciation), the act of speaking.

Guillaume's view of syntax has been expanded by Valin (1981), who sees that as well as a *visée de discours* there must also be a *visée phrastique*, or phrastic intent, where the speaker reviews the linguistic possibilities for realizing the *visée de discours*, and consequently chooses one linguistic strategy rather than another to carry out his aim: this too is axiomatic, a fundamental requirement. Valin also proposes that the direct object is incident to the verb, arguing that a direct object is an *apport* or import to which the verb is a *support*. This indicates that a noun object necessarily undergoes derivation from a primary to a tertiary without any derivational marking, except that in I-E languages with case systems the direct object is marked as an accusative (and many adverbs, such as Latin *passim*, are ancient accusatives). Not all Guillaumians agree with this analysis: Moignet, for example, in his psychomechanical grammar of French (1981), conceives of the verb as being incident to both subject and object. This latter view, however, would make it impossible to distinguish nominative from ergative syntax.

From Valin's point of view, it is possible to argue convincingly that in an ergative system the verb is incident to the patient, as the morphological marking often indicates, and that the agent is incident to the verb, as often marked by oblique cases. Nominative and ergative systems would then be distinguished by different patterns of incidence (i.e., dependency) in the transitive verb, as follows (2):

NOMINATIVE   Agent ← Transitive verb ← Patient   (2)
ERGATIVE   Patient ← Transitive verb ← Agent

the fundamental difference between an ergative construction and an I-E passive being that an ergative is transitive, whereas an I-E passive is intransitive. Likewise the fundamental difference between a nominative construction and an anti-passive is that the anti-passive is intransitive. The disagreements concerning the dependency patterns of SVO are discussed by Guimier (1987), and his second chapter is in fact a comprehensive review of the state of research and progress in psychomechanics a quarter of a century after the death of its founder.

International conferences on the psychomechanics of language have been held on a regular basis. The first international conference was organized by Paul Imbs at Nancy in 1967, and the second, at Quebec, did not take place until 1981. More recent ones have been in France at Cerisy (1983, 1986, 1988) and Pont-à-Mousson (1991), and the most recent (1994) at Cordoba in Spain.

Bibliography

Chesterman A 1991 *On Definiteness. A Study with Special Reference to English and Finnish.* Cambridge University Press, Cambridge

Christophersen P 1939 *The Articles: A Study of their Theory and Use in English.* E Munksgaard, Copenhagen

Guillaume G 1919 *Le problème de l'article et sa solution dans la langue française.* Hachette, Paris

Guillaume G 1929 *Temps et verbe.* H Champion, Paris

Guillaume G 1945 *Architectonique du temps dans les langues classiques.* E Munksgaard, Copenhagen

Guillaume G 1964 *Langage et science du langage.* Nizet, Paris

Guillaume G 1971–1990 *Leçons de linguistique de Gustave Guillaume*, 10 vols. Klincksieck, Paris/Presses de l'Université Laval, Québec (vols. 1–4); Presses de l'Université Laval, Québec/Presses Universitaires, Lille (vols. 5–10)
Guillaume G 1973 *Principes de linguistique théorique de Gustave Guillaume*. Presses de l'Université Laval, Québec
Guillaume G 1984 *Fundamentals for a Science of Language: Excerpts from the Manuscripts*. Benjamins, Amsterdam
Guimer C 1988 *Syntaxe de l'adverbe anglais*. Presses Universitaires, Lille
Hewson J 1972 *Article and Noun in English*. Mouton, The Hague
Hirtle W H 1967 *The Simple and Progressive Forms: An Analytical Approach*. Presses de l'Université Laval, Québec
Hirtle W H 1975 *Time, Aspect and the Verb*. Presses de l'Université Laval, Québec
Jespersen O 1924 *The Philosophy of Grammar*. Allen & Unwin, London
Joly A 1987 *Essais de systématique énonciative*. Presses Universitaires, Lille
Moignet G 1981 *Systématique de la langue française*. Klincksieck, Paris
Molho M 1975 *Sistemática del Verbo español (Aspectos, Modos, Tiempos)*, 2 vols. Gredos, Madrid
Stefanini J 1973 Sur la conception guillaumienne de l'opposition langue/discours. *Travaux de littérature et de linguistique* **11**: 319–28
Valin R 1964 *La méthode comparative en linguistique historique et en psychomécanique du langage*. Presses de l'Université Laval, Québec
Valin R 1981 *Perspectives psychomécaniques sur la syntaxe*. Presses de l'Université Laval, Québec

---

Valency Grammar

David J. Allerton

Valency' (also known as 'valence,' especially in the USA) is the name given in various syntactic theories (such as valency grammar, dependency grammar, and some kinds of functional grammar), to a particular kind of dependency property of lexical items. This kind of lexico–syntactic property involves the relationship between, on the one hand, the different subclasses of a word-class (such as verb) and, on the other, the different structural environments required by those subclasses, these environments varying both in the number and in the type of elements. Valency is thus seen as the capacity a verb (or noun, etc.) has for combining with particular patterns of other sentence constituents, in a similar way to that in which the valency of a chemical element is its capacity for combining with a fixed number of atoms of another element (for example, one in the case of monovalent hydrogen or sodium, two in the case of bivalent oxygen or calcium, etc.). Such information is vital for language learners but was never adequately presented in traditional grammars and dictionaries.

1. The Basic Idea of Valency

Although verbs, for instance, in most languages share syntactic features of a very basic kind, and often inflectional ones too, they differ radically in the number of accompanying noun phrases, prepositional phrases, etc. they require and/or permit (such as subjects, (prepositional) objects, etc.). (Points in the following discussion will be exemplified mainly from English and French, but they should be taken as having more general validity.)

In English the verbs *stumble*, *jolt*, and *thrust* occur in distinctive environments in sentences like *Alfred stumbled*, *Alfred jolted the door*, and *Alfred thrust the key into the lock*, with the result that putting one of these verbs into the distinctive syntactic context of one of the others gives an ungrammatical sequence like **Alfred stumbled the door*, or **Alfred jolted the key into the lock*. Such restrictions mean that verbs need to be subclassified according to their syntactic potential, a fact recognized by traditional grammar in the (inadequate) division into transitive and intransitive verbs, and in transformational grammar in the notion of 'strict subcategorization,' or selectional properties in the lexicon. The special contribution of valency grammarians to the study of this type of subselection has been a thorough investigation of just how much is determined by the verb (or noun, etc.), and of how different potentials of the same verb (e.g., *Alfred pushed/—pushed the key/—pushed the key into the lock*) are related.

2. Varying Views of Valency

The invention of the notion of *valency* (French *valence*, German *Valenz*, Dutch *valentie*), is often credited to Lucien Tesnière, whose *Esquisse d'une syntaxe structurale* appeared in 1953, but whose main work, *Eléments de syntaxe structurale* was only published posthumously in 1959. The notion had, however, been clearly expounded by A. W. de Groot in his Dutch work, *Structurele syntaxis* (1949), and is even hinted at by Karl Bühler in an oft-quoted remark from his *Sprachtheorie* (1934), to the effect that

'...words of a particular word-class open up around them one or several "empty places," which have to be filled by words of certain other word-classes' (1934: 173).

It is nevertheless preeminently Tesnière's notion of valency that has been studied and developed in continental Europe, especially Germany, since the 1960s. On the one hand valency has been integrated with 'dependency theory' by such scholars as J. Ballweg, U. Engel, B. Engelen, H.-J. Heringer, J. Kunze, H. Schumacher, and H. Vater; on the other it has been applied to the detailed description of, most notably, German by G. Helbig and the Leipzig school, but also of English (D. J. Allerton, R. Emons, and T. Herbst), and French (W. Busse and J.-P. Dubost). (For a historical survey up to the mid-1970s, see Korhonen 1977.) The following review of the problems of valency theory will take Tesnière's proposals as a starting point.

3. Tesnière's Approach

Valency can be incorporated into a functional type of constituency grammar (involving relationships between the subcategorization of neighboring constituents), but for Tesnière it was one aspect of dependency grammar. His semantically based syntax is concerned with establishing the hierarchy of word 'connexions' within a sentence, which make up the structural order of words (as opposed to their linear order). The structural order of each sentence is given in terms of a 'stemma,' a two-dimensional display, in which the top-to-bottom dimension represents a series of relationships between 'governors' (or 'heads,' French *régissants*) above and 'dependents' (French *subordonnés*) below. Typically in a 'governor-dependent relationship' the governor may occur without the dependent but not vice versa, and the governor provides the central semantic element whereas the dependent only represents a modification of this.

Considering the partial structural stemma of (1a) in Fig. 1, a number of points in Tesnière's account can be appreciated: first, the governor-dependent relationship can operate at different levels (with *old* acting as dependent of *the grammarian* but as governor of *very*); second, one governor (like *the grammarian*), can have more than one dependent (*old* and *French*, in this case) but not vice versa; third, an 'empty word' like *the* can combine with a 'full word' like *grammarian* to form a single 'nucleus' (marked with a so-called 'circle'), that is, a single point on the stemma. Each governor is said to act as a 'node' (French *noeud*) for all of its direct and indirect dependents, so that *the grammarian* acts as a node for the whole of the stemma of (1a) in Fig. 1.

In a typical sentence, like that of (1b) in Fig. 1, Tesnière sees the main verb as the 'central node' (*noeud des noeuds*). The verb achieves this central role through its high position in the hierarchy of connexions but also through its ability to determine the number and variety of its dependents. But the question of how many dependents a verb has is no simple matter. In fact Tesnière distinguishes two types of dependent for verbs, to which he gives the labels *actants* and *circonstants*. From a semantic point of view the *actants* represent the participants, while the *circonstants* represent the setting and incidental details of the process or state expressed by the verb, the whole sentence portraying a mini-drama. In the example of (1b), where *offered* represents the process, *Alfred*, (*that*) *Bible*, and *to Charles* would be *actants*, while *repeatedly*, *in Strasbourg*, and *on Tuesday* would be *circonstants*.

4. An Essential Distinction: *Actants* versus *Circonstants*

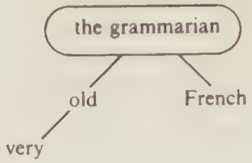
Everything so far noted about Tesnière's views has been a matter of general dependency theory, but the distinction between *actants* and *circonstants* is distinctively the preserve of valency theory. *Actants* belong to the valency of individual verb types, whereas *circonstants* are in principle potential dependents in any sentence, regardless of the verb. Thus the constellation of *actants* represented in (1b) is characteristic of one subclass of English verbs that includes not only *offer* but also *give*, *lend*, *refuse*, *sell*, *send*, and a couple of dozen others.

In (1b) *Alfred*, *that Bible*, and *to Charles* would be termed by Tesnière first, second and third *actant* respectively, and these terms correspond to what in English grammar are normally called subject, (direct) object, and indirect object respectively. These are the only elements that Tesnière recognizes as *actants* in active sentences, which is unfortunate, because many prepositional phrases are equally essential to the verb, such as the prepositional object *on Barbara* in *Alice relied on Barbara*, and even purely adverbial phrases are required by certain verbs, such as *live* (*at home*, etc.), *last* (*two hours*, etc.) or *thrust*, which, as noted earlier, needs both an object and a specification of place.

The subclass of verbs that includes *offer*, *give*, etc. is described as 'trivalent,' because its members require three *actants*; the same could be said of the subclass of *thrust*, *put*, etc., although Tesnière did not recognize this. Ordinary transitive verbs like *jolt* or *like*, *kill*, etc., which merely require a subject and a direct object, are termed 'bivalent' (or 'divalent'); and the same could be said of copular verbs like *be*, *seem*, or *become* that take an adjectival or nominal predicative (complement) such as *beautiful* or *a beauty*. Finally, ordinary intransitive verbs like *stumble* or *deteriorate*, *sneeze*, etc. are described as 'monovalent' (for 'zero-valent' (= 'avalent') verbs, see Sect. 7).

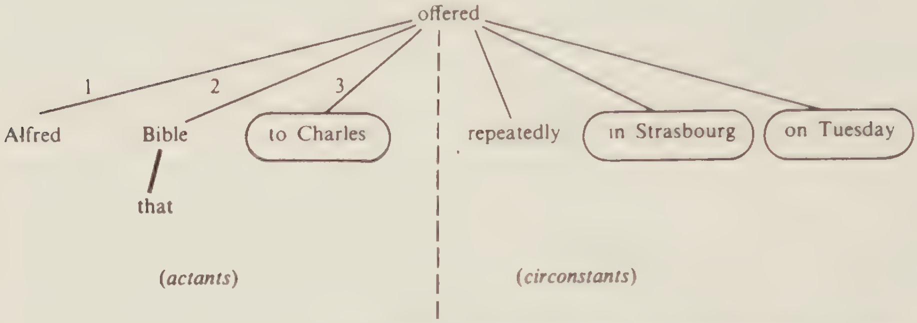
By contrast with *actants*, the adverbials of (1b) are not relevant to valency classification. Thus *repeatedly*, an adverbial of frequency, *in Strasbourg*, a positional

(1a)



Stemma for *the very old French grammarian* (after Tesnière)

(1b)



Stemma for *Alfred repeatedly offered that Bible to Charles in Strasbourg on Tuesday* (after Tesnière)

(1c)

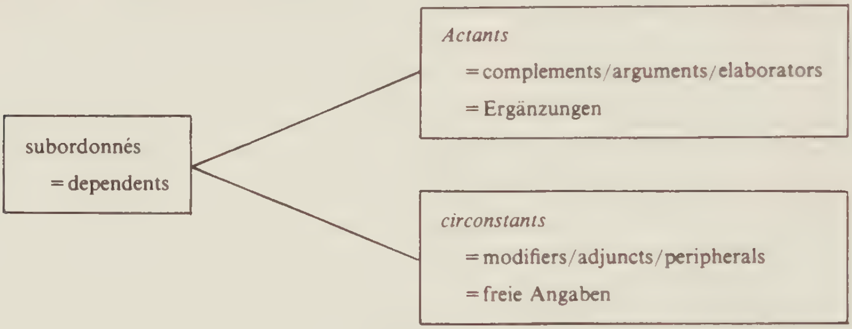


Figure 1. Stemmas and types of dependent.

adverbial of place, and *on Tuesday*, a punctual adverbial of time, could all just as well have occurred with the different verb subclasses represented by *stumble*, *jolt*, and *thrust*, in fact with any verb at all. Tesnière (1966: 125) mistakenly insists that such adverbials are unlimited in number (by contrast with the fixed number of *actants*), but the essential point is their universality, their freedom to occur in any sentence.

Through the history of valency theory and grammatical theories such as transformational grammar (cf. Baker 1989: 266–67), and systemic grammar (cf. Halliday on 'participant roles and circumstantial roles'), various technical terms have been used to refer to the distinction between these two kinds of dependent of a governor (or head). These are listed in (1c) in Fig. 1. For clarity's sake the terms 'verb elaborator' and 'free modifier' will henceforth be used for the post-Tesnièrian equivalents of *actant* and *circonstant*. (Although the term complement is commonly used in the sense of elaborator, it has the disadvantage that for traditional grammarians and many modern ones it has a quite different meaning and may exclude the subject, which the terms elaborator and *actant* never do.)

Whatever the terminology, there is a consensus about the need for a distinction between elaborators and free modifiers; but there are certain problems associated with it. Clearly Tesnière oversimplified matters by insisting that, in principle, elaborators (*actants*), were essentially nominal in form and semantically necessary to the verb, while free modifiers (*circonstants*) were adverbial in form (including prepositional phrases), and semantically not required by the verb. German valency theorists, such as Helbig, Heringer, and Herbst, have proposed tests for distinguishing the two kinds of dependent. Helbig, for instance, suggested that in sentences like the following:

Alice ate the sandwich in the train. (1)

Alice put the sandwich in the fridge. (2)

the status of the adverbial phrases differs partly because *in the train* is omissible while *in the fridge* is not, but also because the first phrase, but not the second, has regularly corresponding sentences of the form:

Alice was in the train when she ate the sandwich. (3)

What Alice did in the train was $\genfrac{}{}{0pt}{}{\text{(to) eat}}{\text{she ate}}$ a sandwich. (4)

These correspondences to related sentences seem to indicate that *in the train* in (1) is a free modifier or 'adjunct,' whereas *in the fridge* in (2), though an adverbial, is verb elaborator, just like the earlier examples of obligatory adverbials with the verbs *live*, *last*, and *thrust*.

All obligatory elements are therefore verb elaborators, but this does not mean that all optional elements are free modifiers. Even Tesnière only suggested that elaborators (*actants*), are 'often indispensable to complete the sense of the verb' (1966: 128). Helbig, in fact, proposes a three-way division into 'obligatory elaborators,' 'optional elaborators,' and free modifiers ('*obligatorische/fakultative Ergänzungen*, *freie Angaben*'). The following examples suggest the need for an even more subtle analysis:

Alfred was editing the play. (5)

Alfred was watching [the play]. (6)

Alfred was reading (the play). (7)

Alfred was idling. (8)

The first three have *the play* as the object of the verb and therefore as a potential part of its valency; but it is only in the first sentence that the object is obligatory. In both the second and the third sentences *the play* may be omitted, but under different conditions: whereas in (6) the objectless version of the sentence always requires the listener to identify the thing watched from what is evident in the context, in (7) the objectless sentence leaves the thing read totally open as a matter of no immediate interest (cf. Allerton 1982: 68–70). Thus while the optional object is clearly part of the valency of *watch* in all its uses, the verb *read* appears to have two different valencies, only one of them involving an object. In (8), finally, no object is possible with the unequivocally intransitive verb *idle*; an object can therefore be no part of its valency. This truism suggests a useful general test: if an element, such as an object noun phrase, can only be added to certain verbs and not to others, then it participates in verb valency, in contrast to, say, a time adverbial like *yesterday* or *today*, which can be freely added to any sentence (given an appropriate tense form). The test of insertion, rather than that of omission, is therefore most useful for distinguishing elaborators from free modifiers.

5. The Diversity of Elaborators

Further tests are needed for deciding what kinds of elaborator need to be distinguished. A substitution test, for instance, is useful in assessing combinations of verb and prepositional phrase. All the prepositional phrases in the following sentences are omissible elaborators, and yet they do not all have the same status:

Alice listened to the big waves. (9)

Alice concentrated on the big waves. (10)

Alice swam to the big waves. (11)

Alice floated on the big waves. (12)

A comparison of the first two sentences (9–10) shows not only that the preposition is selected by the verb but even that no other preposition is possible without a change in the nature of the combination; the prepositional phrase is therefore some kind of prepositional object (a category not allowed for by Tesnière but standard in German valency grammar). The prepositional phrases in (11) and (12) are, however, different for a number of reasons: first, the preposition can be replaced with a range of other prepositions to give a series of regular semantic contrasts (*to* → *into*, *towards*, *under*, etc.; *on* → *over*, *near*, *behind*, etc.); second, while the prepositional phrases of (11) and (12) demonstrate their place-adverbial nature through their capacity for being preceded by particles like *right*, those of (9) and (10) reject this possibility; finally, the latter phrases show their partly nominal nature through their elicitation with a *What*- + preposition question, as compared with the *Where* (... *to*) question typical of the adverbials of (11) and (12).

These and similar criteria have been referred to by valency grammarians establishing the various possible elaborators of verbs. It has become clear that these include not only noun phrases but also prepositional phrases and adverbs. They also include adjective phrases, as in the first two (13–14) of the following sentences:

Alfred kept fit. (13)

Alfred remained fit. (14)

Alfred remained an athlete. (15)

Alfred insulted an athlete. (16)

The first three of these sentences illustrate the pattern of a verb with what is in traditional grammar called a complement but in most modern works is referred to as a 'predicative' (following Jespersen). Most typically this is an adjective phrase, as in (13) and (14), but where it is a noun phrase, as in (15), this may generally be replaced with an adjective phrase. One way in which predicatives differ from objects is in their nonacceptance of 'clefting,' with the result that **It was an athlete that he remained* is not a possible sentence, while *It was an athlete that he insulted* is perfectly natural.

Clearly predicatives and objects are noun phrases with rather different functions, and it can be argued that function is a vital ingredient in the specification of elaborators, particularly in a noncase language like English. 'Passivization' of a sentence, in particular the moving of an active object to subject position in the corresponding passive (e.g., changing (16) above to *An athlete was insulted by Alfred*), can play a part in evaluating such functions. In a language like German, on the other hand, it might be sufficient to define elaborators with such labels as accusative object, dative object, prepositional object, etc. and regard the predicative as nominative kind of object, since passivization is not limited to sentences with any one kind of object (though, admittedly, only the accusative object can become the passive subject). One view of the total range of English verb elaborators other than the subject is given for bivalent verbs in Fig. 2.

6. The Special Status of Subjects

The range of English verb elaborators displayed in Fig. 2 expressly excludes the subject. But, as noted above, valency grammarians differ from other grammarians in seeing the subject not as standing apart from the predicate or verb phrase but rather as standing alongside the object as an elaborator. As Tesnière puts it (1966: 109): '*... du point de vue structural ... le sujet est un complément comme les autres*'; but this is something of an oversimplification.

The subject has a special place as regards inflectional morphology. In languages that have grammatical case frequently there is a case such as nominative that is selected regardless of the lexical verb used, whereas verbs may govern objects in at least two different cases (as in German or Russian). As for the verb's own inflections, these commonly agree with the number, person, etc. of the subject but not the object, whereas the reverse never obtains. Languages with an ergative case, like Basque, are slightly different in these two respects.

In terms of syntactic form subjects, first, have greater positional prominence in the sense that, in the absence of a specially marked theme, the subject occurs typically as the first noun phrase in the sentence—a feature shared by SOV, SVO, and VSO languages, that is, well over 90 percent of the world's languages. Second, as regards syntactic dependence for occurrence, the subject normally has a higher priority than the object, in the sense that with all verbs or (depending on the language) the vast majority of them a subject is obligatory, while an object is only required by a proportion of verbs (transitive ones). It is of course true that many languages—so-called 'prodrop languages' like Spanish, Italian, or Japanese—allow the subject to be omitted when it is identifiable from the linguistic or situational context (e.g., Spanish *vino* 'he/she/it came'); but these languages further allow the objects of many verbs to be omitted with no requirement of contextual recoverability (just like English *read*, discussed above, cf. Spanish *leyó* 'he/she/it read (something)'), and of course purely intransitive verbs (like Spanish *venir* 'come') reject objects altogether.

Finally, the subject (but not the object) has a textual role in being the typical sentential theme, one often carried forward from previous sentences, and is often phonologically marked as such (in English, for instance, often through a separate intonation unit). On the whole, then, subjects stand apart from other verb elaborators and need to be accorded a special status vis-à-vis the verb; but they are elaborators nonetheless.

7. Levels of Analysis

The above discussion of subjects and objects partly presupposes a clear definition of these categories. But this is a complex issue, in which much hinges on the relationship between transitive active sentences and passive sentences as well as sentences with other formats. Consider a pair of sentences like:

Alice attacked Barbara. (17)

Barbara was attacked by Alice. (18)

According to most criteria (position, agreement, obligatoriness, for instance) *Alice* is the subject of (17), whereas *Barbara* is the subject of (18) despite the virtual synonymy of the two sentences. Tesnière accepts such an analysis but notes that the subject of the passive, *Barbara*, has the same semantic role ('patient' or 'sufferer' of the verbal action) as the object of the active sentence; whereas the subject of the active sentence, *Alice*, has the same semantic role ('agent') as the passive agentive phrase, *by Alice*, which he terms 'counter-subject.' What Tesnière fails to note is that these semantic roles are not valid for all active and passive subjects, objects, and counter-subjects; rather it is a matter of the semantic valency requirements of individual verbs, as exemplified by the similar correspondences observable in the following sentences:

Alice liked Barbara. (19)

Barbara was liked by Alice. (20)

Alice pleased Barbara. (21)

Barbara was pleased by Alice. (22)

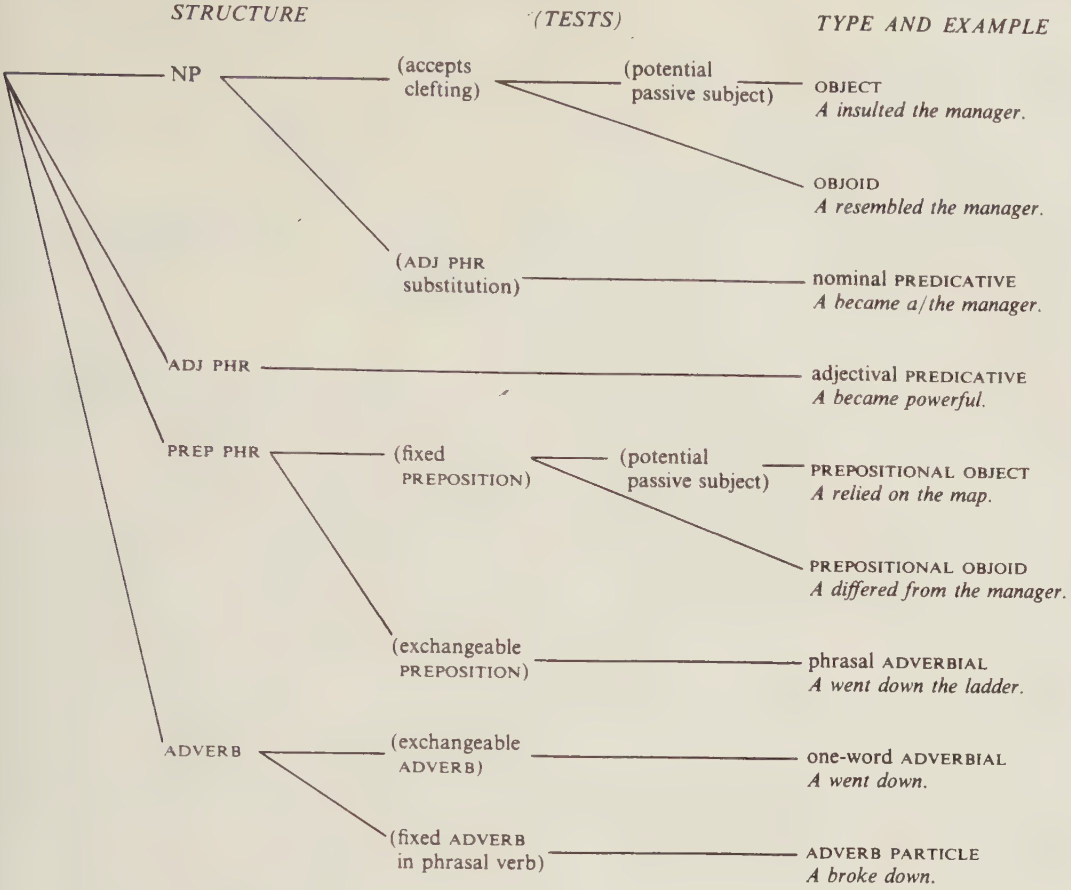


Figure 2. Types of English phrasal elaborators (excluding the subject) for bivalent verbs (after Allerton 1982).

Thus, while in the first two sentences (19–20) with *liked*, the active object and the passive subject, *Barbara*, agree in being the causer or stimulus of the emotion described by the verb, in the last two sentences (21–22) with *pleased*, it is the active subject and passive counter subject, (*by*) *Alice*, that have this kind of role. There is a similar exchange of syntactic functions between the *liked* sentences and the *pleased* sentences for the other semantic role of 'mental experiencer.' So while precise semantic roles are determined by the meaning of individual verbs (cf. also *defeat* and *lose* (*to*)), there is, given sentences containing any particular verb, a crucial correspondence between the syntactic functions of the active and the passive format of related sentences, and therefore a need to recognize a level of analysis independent of and intermediate between superficial subjects and objects on the one hand and purely semantic roles on the other. This is the level of deep or underlying subjects and objects.

A further reason for recognizing this underlying level of description is the behavior of certain meteorological verbs, as exemplified by English *It was raining*, French *Il pleuvait*, and Spanish *Llovía*. In Spanish (and other prodrop languages), it is impossible to have a subject with such verbs in their normal use, and the verb *llover* can be said to be zero-valent (or 'avalent,' to use Tesnière's term). In English and French the words *it* and *il* respectively fulfil the requirements discussed above to qualify as superficial subjects; but such a subject has no clear semantic role and is not replaceable (by *the weather*, etc.), and it seems that it may simply be part of the required surface structure for English and French sentences without corresponding to a true valency subject. For the corresponding German form *Es regnet* the situation appears to be slightly different, because sentences without a (nominative) subject do occur (e.g., *Mich friert* 'Me is freezing = I am freezing,' *Mir ist kalt* 'To-me is cold = I am cold,' *Mir wurde geholfen* 'To-me was helped = I was helped'). (NB The initial pronoun in these sentences is the theme but not the subject.) It

	Valency gap	*Valency subject*	*Valency object*
Sentence with:			
Zero-valent verb e.g., *rain*	SURFACE SUBJECT	—	—
Monovalent verb e.g., *stumble*	—	SURFACE SUBJECT	—
Divalent verb e.g., *jolt*:			
—active	—	SURFACE SUBJECT	SURFACE OBJECT
—passive	—	SURFACE COUNTER SUBJECT	SURFACE SUBJECT

Figure 3. Correlation of English valency and surface functions.

could therefore be argued that, since this empty German *es* is not required by any general rule of sentence structure but is demanded by such meteorological verbs, it is a required (though empty) elaborator.

A summary of the relationships between valency functions and surface form in English meteorological sentences, ordinary intransitive and transitive sentences, both active and passive, is given in Fig. 3. Trivalent verbs of the indirect object type discussed (like *offer* and *give*), also appear in two formats in English, as exemplified by:

Alfred handed that Bible to Charles. (23)

Alfred handed Charles that Bible. (24)

These two formats can be regarded as variant realizations of the same valency pattern, with the indirect object appearing either after the object and with a preposition (as in (23)) or before it and without a preposition (as in (24)).

8. Reflexive and Causative Verb Patterns

Rather different in its valency implications is the kind of obligatorily reflexive verb exemplified by *absent oneself* in (25), compared with the incidentally reflexive verb of (26):

Alice absented herself from the meeting. (25)

Alice criticized herself at the meeting. (26)

Since a nonreflexive object is impossible with the verb *absent*, the *herself* of (25) cannot be said to express an independent semantic role beyond that of the subject, which in this case can be described as agent. In (26), on the other hand, *herself* has the role of patient (or affected entity), with the subject again having the role of agent. But in both cases the reflexive pronoun fulfils the valency function of object, a (prepositionless) noun phrase immediately following the lexical verb, so that both verbs can be regarded as bivalent.

This view of the valency of reflexive verbs differs from that of Tesnière, who saw reflexive verbs as manifestations of a different kind of verbal voice, the so-called 'recessive' (French *récessif*), which reduced the valency of a verb by one, so that bivalent verbs like *lever* 'raise,' or *ouvrir* 'open (transitive)' become monovalent when reflexive (*se lever* 'rise, stand up,' *s'ouvrir* 'open (intransitive)'). Although this is an interesting view, it is something of an oversimplification.

In fact reflexive verbs in French (and many other languages, including German), seem to have at least four different kinds of status. First, verbs like *se laver* 'wash oneself,' or *se critiquer* 'criticize oneself' are ordinary transitive verbs that can have a reflexive object as an alternative to a normal one, but the reflexive one has no special significance for verb valency. Second, verbs like *s'absenter* 'absent oneself,' or *se souvenir* (*de*) 'remember' do not have a nonreflexive use, and thus the reflexive pronoun is an empty elaborator, even though an essential one, rather similar to the *es* of German *Es regnet* (discussed in Sect. 7). Third, there are verbs like *douter/se douter* 'doubt/imagine, suspect,' or *résoudre/se résoudre* (*à*) 'solve/decide,' which have both a nonreflexive and a reflexive use, but where the semantic difference is too great for them to be simply counted as the same verb; in fact, reflexivization is used almost like a device of word-formation for producing a new lexical item, one which has to count as a compulsorily reflexive verb. Fourth, there are verbs like *ouvrir* and *vendre*, for which the reflexive pattern is used to convey the idea that the subject is semantically the patient (and hence also object), and that there is no explicit agent, which is why the patient has to fill the subject position too, as in *La porte s'ouvre* 'The door opens (itself).' This reflexive use truly is a way of coping with a reduced number of semantic roles and gives rise to 'polyvalency,' that is, a verb displaying the same meaning in two quite different grammatical uses.

Tesnière also recognized syntactic devices for increasing the valency of verbs, such as French causative constructions with *faire*. English causative constructions with *have*, *make*, and *cause*, etc. preserve subject and object functions in the embedded infinitive clause of sentences like those of (27) and (28) below, so that *Alfred* remains the subject and *Balzac* the object of the verb (*to*) *read*, just as they would have been in a full sentence with the same content (*Alfred reads Balzac*, for instance):

John had Alfred read Balzac. (27)

John caused Alfred to read Balzac. (28)

In French, on the other hand, *faire* seems to combine with infinitives to form complex verbs like *faire mourir* 'have ... die,' *faire apprendre* 'have ... learn,' *faire ... donner* 'have ... give,' to give sentences like the following (adapted from Tesnière), in which *Jean* is introduced as the causer or instigator and as subject of the whole *faire* + VERB complex, displacing *Alfred* from subject position:

Jean fait mourir Alfred. (29)
(cf. Alfred meurt.)

Jean fait apprendre le bulgare à Alfred. (30)
(cf. Alfred apprend le bulgare.)

Jean fait donner la Bible à Charles par Alfred. (31)
(cf. Alfred donne la Bible à Charles.)

As Tesnière points out (1966: 260–62), French requires that the displaced subject should occupy the next available place down the hierarchy, starting with the object (= second *actant*) as in (29), going on to the indirect/prepositional object (= tierce *actant*) as in (30), and going on as far as the agent phrase (= quatrième *actant*) as in (31).

Other languages have different ways of dealing with the valency of causative relationships. One possibility is to have a morphologically related verb derived with an affix to create a verb of different valency: the German prefix *be-*, for instance, often has the effect of converting an intransitive verb into a transitive one, as in the pairs *arbeiten/bearbeiten* 'work/work on, process,' *enden/beenden* '(come to an) end/end, complete.' A further possibility is to allow polyvalency in such a way that the same verb may be used intransitively and transitively in a causative sense without change of form, as with the many so-called ergative verbs of English, which typically refer to a change of state or position. Verbs such as *break*, *cook*, *open*, *roll*, and *sink* have a monovalent use as in (32) below beside a bivalent one with a causative meaning as in (33):

The glass broke. (32)

John broke the glass. (33)

With such verbs the subject of the intransitive pattern and the object of the transitive pattern have a similar semantic role of patient affected, while the transitive subject has the role of agent.

9. Adjective and Noun Valency

Although Tesnière confined valency to verbs, it has been naturally extended to adjectives and nouns by later valency grammarians. Predicative adjectives combine with copular verbs to form a unit that has many features in common with verbs, including similar valency requirements: for instance, *be afraid* (*of*) can be compared with *fear*. Admittedly the adjective (phrase) *afraid* (*of*) can be regarded as an elaborator of the verb *be*; and it is true that predicative adjective phrases occur with various verbs other than *be*, such as *become*, *remain*, *seem* (not to mention the trivalent *make* (*someone/something* ...), *keep* (*someone/something* ...), etc.), and thus involve a second order valency. On the other hand, the adjective's valency extends beyond what is normally termed adjective complementation, as in *afraid of the dark*, to cover the subject of its companion verb. An adjective like *afraid*, for instance, requires an animate subject with the role of experiencer. Other predicative adjectives have requirements that link subjects with other elaborators, as the following examples demonstrate:

Alfred is similar to Alice. (34)

Alice and Alfred are similar (to each other). (35)

[Alice is mad about cars.] Alfred is similar. (36)

Clearly *similar* (*to*) implies two entities, but these can be referred to in three different patterns: in (34) one entity is the subject and the other occurs as an adjectival 'postelaborator'; in the (35) pattern, which involves a reciprocal meaning, the subject must be plural, and the postelaborator is freely omissible; in the (36) pattern, finally, the postelaborator element must be supplied from the context (just like the object of the verb *watch*, discussed in Sect. 4). The elaboration patterns of such adjectives thus cannot be adequately described without reference to the subject.

Most English adjectival elaborators are like verb elaborators in that they follow the word they elaborate. There is, however, one important difference: while the majority of verb objects have no preposition in English, virtually all adjectives do require a preposition before their complement (the one clear exception being *worth*). As in the case of prepositional verbs, the adjectives each select a particular preposition, in an often arbitrary way, for example, *keen on*, *eager for*, *dependent on*, *independent of*, *free of/from*. Sometimes the adjective's choice of preposition agrees with that of a corresponding verb, sometimes the verb has a different preposition, or no preposition at all:

Alice was hopeful of success. (37)
(cf. Alice hoped for success.)

Alice was hungry for power. (38)
(cf. Alice hungered for power.)

Alice was desirous of wealth. (39)
(Alice desired wealth.)

Adjectives with more than one postelaborator are relatively rare but can be found, for example, *responsible to* (*someone*) *for* (*something*).

In case languages some elaborators of adjectives occur without a preposition, but instead they occur in a particular case form required by the adjective. In German this is most commonly the dative, and such elaborators most commonly precede the adjective, as in (40) below; on the other hand, *anders* 'different,' is complemented with the case-neutral subordinator *als*, which follows, as in (41):

Alfred ist seinem Bruder sehr ähnlich. (40)
(cf. Alfred is very similar to his brother.)

Alfred ist ganz anders als sein Bruder. (41)
(cf. Alfred is quite different to/from his brother.)

(Note that *sehr/very* and *ganz/quite* are free modifiers and thus strictly outside adjective valency; the preference for the one or the other in these cases is determined semantically rather than lexico-grammatically.)

Noun valency can be compared with adjective valency, particularly for nouns derived from adjectives, though the selection of prepositions in noun complements, too, only partly corresponds to that in related words (i.e., adjectives and verbs), as illustrated by these examples:

Alice's dependence on her parents (was obvious). (42)
(cf. Alice was dependent on her parents.
Alice depended on her parents.)

Alfred's pride in the project (was obvious). (43)
(cf. Alfred was proud of the project.
Alfred prided himself on the project.)

Noun valency therefore also needs to be specified independently. It even has special features of its own. First, there are many nouns without a corresponding verb or adjective that take a complement, for example, *daughter* (*of*...), *president* (*of*...), *headquarters* (*of*...), *advantage* (*of*...), *appetite* (*for*...). Second, as the above examples make clear, English *of*, often corresponding to a genitive case in case languages, is the favored preposition; thus an *of* noun complement often corresponds to the simple object of a transitive verb (without a preposition), for example, *bombardment/defence/besiege of the castle* (cf. *bombard/defend/besiege the castle*), but even here there are exceptions, such as *attack on the castle*. The most striking feature of noun valency, however, is the fact that the item corresponding to the subject of a verb, particularly of a transitive one, can appear in a language like English as a possessive determiner (i.e., in place of an article), as an alternative to its occurrence as a prepositional complement, as the following examples show:

a/the defeat, a/the collapse [simple *determiner* + NOUN]. (44)

Alfred's collapse, the collapse of Alfred, *the collapse by Alfred. (45)

Bernard's defeat (?by Alfred), the defeat of Bernard by Alfred, Alfred's defeat of Bernard, *the defeat of Alfred of Bernard. (46)

Although complex interrelationships are involved in the above, and border lines are not always clear, it can be said that *by* complements normally correspond to transitive subjects, possessives to transitive or intransitive subjects (and occasionally objects), and *of* phrases to intransitive subjects or to objects. Furthermore, two complements of the same kind are not allowed.

10. Embedded Clauses as Part of Valency

Many verbs, adjectives, and nouns, besides their normal complementation with phrases (whether nominal, prepositional, or adjectival) also allow complementation with finite or nonfinite clauses. Alongside phrasal complementation like *Alice wanted a holiday* or *Alice realized her mistake*, verbs like *want* or *realize* also permit clausal complementation as in (47) and (48) respectively:

Alice wanted to go to Switzerland. (47)
Alice wanted Angela to go with her.

Alice realized that she had made an error. (48)
Alice realized how she had gone wrong.

It is part of the valency of the verb *want* that it can occur with a following infinitive, with the further possibility of specifying a different subject (here *Angela*) for this infinitive, whereas *enjoy*, for instance, is impossible with the infinitive but natural with a gerund construction (e.g., *going to Switzerland*). The verb *realize* is impossible with both infinitive and gerund but does occur with a finite clause as in (48) above. Both nonfinite and finite clausal complementation can be regarded as cases of 'embedding,' that is, downgrading of a sentential structure to play a lower level role as a verb elaborator. But in any case verbs need to be lexically specified for the types of embedded pattern they accept. Some verbs, moreover, are restricted to clausal complementation: the verb *condescend*, for instance, always requires a following infinitive. Finally, the above points concerning verbs apply equally to adjective and noun complementation, as these phrases show: *able to speak French*, *capable of speaking French*, *confident that she could speak French; a tendency to speak French*, *a habit of speaking French*, *the fact that she spoke French*.

11. The Limits of Valency

Verbs, adjectives, and nouns are the three major lexical word classes for which the concept of valency is clearly appropriate and for which detailed language studies have been made and preliminary dictionaries compiled. An important issue is whether the concept be extended further, beyond the occasional adverb directly derived from an adjective and copying its valency (e.g., *independently of Alfred*). Transformational grammarians have suggested grouping together spatio–temporal adverbs and prepositions respectively as intransitive and transitive particles (or 'prepositions' in a new sense), transitive ones involving complementation with noun phrases and prepositional phrases. This insight could be applied to valency to give a classification something like the following:

Particles (or new prepositions)

(a) *zero-valent*:	nearby, home; soon, previously
(b) *monovalent*	
(obligatory simple object):	at, to(wards), from; during
(omissible simple object):	in, above, off; after, before
(omissible prepositional object):	out (of), in front (of)
(c) *bivalent*:	between (. . . and . . .)

But there are problems with such an analysis: for instance, whether the situated entity (the subject or object of the sentence), should be included as a further elaborator, thus increasing all the above valencies by one; whether *out of* (or *away from*) really contains two words of the same word class particle/'preposition' (albeit of different subclasses); whether *above* and *out* (etc.), in their unaccompanied uses always imply an omitted object.

Although the application of valency grammar can thus be extended, it is not really intended to account for the whole of a syntactic system, any more than Fillmore's 'case grammar' (see *Case Grammar*). Valency is a matter of the subcategorization of lexical categories, and therefore in a strict sense would exclude:

(a) coordinate structures, which are treated separately both by Tesnière (under the heading of French *jonction*) and in Hudson's *Word Grammar* (where they are basic and not derived from word–word relations);

(b) grammatical 'specifiers,' such as auxiliaries and (nonpossessive) determiners, which although treated as dependents (or even governors) by many dependency grammarians, were regarded by Tesnière as involving a different relationship to main verbs and nouns respectively—a view still valid today;

(c) 'subordinators' in Tesnière's interpretation, which embraced prepositions and subordinating conjunctions, these being for him convertors (French *translatifs*), of noun phrases or clauses to adverbial or adnominal function (e.g., adverbial (*Alfred arrived*) *before the concert/before I arrived*; adnominal (*Alfred liked the book*) *in the window/which he'd seen in the window*)—again a theoretically tenable position.

Valency can thus evidently be included in a dependency grammar; for Engel (1977: 116), in fact, valency is simply a matter of dependency on subclasses. Equally valency can be incorporated into a functional grammar or a functionally enriched constituency grammar, albeit under a different rubric. Furthermore, valency characteristics have, in recent years, increasingly been incorporated into dictionary entries, and improved specialist valency dictionaries are being prepared (for instance the Augsburg one for English, initiated by T. Herbst and D. Heath). One thing is clear: valency relationships must find a place in every complete linguistic description.

Bibliography

Abraham W (ed.) 1978 *Valence, Semantic Case and Grammatical Relations*. Benjamins, Amsterdam

Allerton D J 1982 *Valency and the English Verb*. Academic Press, London

Baker C L 1989 *English Syntax*. MIT Press, Cambridge, Massachusetts

Bühler K 1934 *Sprachtheorie*. Fischer, Jena

Busse W, Dubost J-P 1977 *Französisches Verblexikon*. Klett, Stuttgart

Emons R 1976 *Valenzgrammatik für das Englische: Eine Einführung*. Niemeyer, Tübingen

Engel U 1977 *Syntax der deutschen Gegenwartssprache*. Schmidt, Berlin

Fillmore C J (1977) The case for case re-opened. In: Cole P, Sadock J M (eds.) *Syntax and Semantics 8: Grammatical Relations*, pp. 59–81. Academic Press, New York

Groot A W de 1949 *Structerele syntaxis*. Servire, The Hague

Helbig G (ed.) 1971 *Beiträge zur Valenztheorie*. Mouton, The Hague

Helbig G, Schenkel W 1973 *Wörterbuch zur Valenz und Distribution deutscher Verben*. VEB Bibliographisches Institut, Leipzig

Herbst T 1983 *Untersuchungen zur Valenz englischer Adjektive und ihrer Nominalisierungen*. Narr, Tübingen

Herbst T 1988 A valency model for English nouns. *Journal of Linguistics* **24**: 265–301

Heringer H-J 1973 *Theorie der deutschen Syntax*, 2nd edn. Hueber, Munich

Hudson R A 1984 *Word Grammar*. Blackwell, Oxford

Korhonen J 1977 *Studien zu Dependenz, Valenz und Satzmodell*, vol. I. Lang, Berne

Schumacher H (ed.) 1976 *Untersuchungen zur Verbvalenz*. Narr, Tübingen

Tesnière L 1953 *Esquisse d'une syntaxe structurale*. Klincksieck, Paris

Tesnière L 1966 *Eléments de syntaxe structurale*, 2nd edn. Klincksieck, Paris

Functional Grammar

André Martinet

1. Functional Linguistics: A Short Historical Survey

In the course of the twentieth century, the term 'functional' has been applied, on several occasions, to different types of linguistic practice: first of all, by members of the Prague Linguistic Circle, from the late 1920s onward, with a value close to the one that will be retained here, and later on, by Louis Hjelmslev with a sense reminiscent of its mathematical use and akin to that found in 'grammatical functions,' i.e., pointing to relations between items. More recently, it has been used by some followers of the transformational and generative trends, or by people initially influenced by, but departing from, them. As will appear from what follows, the functional linguistics recommended employ 'functional' in its most usual meaning of 'adapted to achieve some end.' This use has been adopted, to some extent at least, by the members of the International Society for Functional Linguistics (= SILF standing for the French *Société internationale de linguistique fonctionnelle*).

The first linguists who pointed to the necessity of a conscious functional approach were the Prague phonologists. In the wake of Karl Bühler (1931), they operated with the principle of abstractive relevance according to which any scientific approach chooses a viewpoint that determines what observable facts shall be retained and what shall be disregarded as irrelevant for a given research. Experience has shown that the functioning and evolution of languages depends first and foremost on their use as communicative mediums. Therefore communicative relevance is the first, if not the sole, relevance to be reckoned with.

In the same way as glossematics took shape as a reaction to Prague teachings, functional linguistics, stemming from the same Saussurian stock, has, in many respects, developed in contrast to glossematic positions (Martinet 1977). The main features that characterize glossematics are: (a) the constant parallelism between the two faces of the sign presented as expression and content, (b) the rejection of phonic and semantic substances in favor of pure relations, this leading to (c) the disregard of changes affecting substance, resulting in a tendency to equate the successive stages of a language and thereby leading to a purely static approach.

On these three points, functionalism is in total disagreement: (a) the asymmetrical pattern of double articulation into phonemes and monemes contrasts with Hjelmslev's isomorphic approach; (b) relevant substance is retained in order to qualify relations; and (c) changes in substance are found to pave the way toward a reshuffling of the relational network.

Operating with relevant substance leads to positing a functional linguistic reality. Linguistic structures are thus deemed to be facts with a real existence in human behavior, and by no means, as widely assumed, mere contrivances of the descriptivists.

Contrasting with the enrichment derived from the permanent, even if antithetic, contacts between glossematicians and functionalists, the reaction of the latter to generativism has always been totally negative (Martinet 1975: 82–88). The assumption of an innate language organization distinct from the various mental equipments of man was rejected from the start as gratuitous. The arbitrary and conflicting statements regarding a so-called 'deep structure' were denounced as entirely subjective (Martinet 1975: 231–32). The transformative operation was described as an unnecessary departure from an observation and comparison of real utterances leading to the establishment of syncretisms.

Functionalism was introduced into the UK by Jan Mulder, and later developed at St Andrews University by Mulder and Sándor Hervey (1980). Its basically axiomatic basis has been emphasized and a logical apparatus devised that anticipates a confrontation with a large variety of linguistic facts, a procedure that contrasts with the more pragmatic, step-by-step 'continental' approach.

2. An Empirico-deductive Approach

The obvious fact that languages differ through space and time is indicative of the nature of human language. It points to its constant adaptation to the varying needs of human communities. Contacts will breed linguistic convergence, with concomitant divergence among those who do not participate in the same contacts. This amounts to saying that communicating with language may be conducive to linguistic changes and, in short, that languages change because they function. Those who describe languages should take this into consideration, and, by comparing the usages of co-existing generations, try to determine the direction and rhythm of their evolution.

The observation of natural languages has shown that they have a number of features in common. First of all their communicative function. No one would deny their fundamental contribution to the ordering of human experience. But this results from the analysis of that experience made necessary by the need to communicate it from person to person.

The next common feature is their use of vocal utterances. This is often forgotten, nay, intentionally omitted by those who want to operate with relations rather than substance or do not feel at ease in phonic matters. The argument that some languages practically exist only in a written form is invalidated by the fact that they originated as spoken mediums and are organized accordingly. The linearity of speech could, in Saussurian terms, be considered irrelevant for 'language' proper, the occasional use of respective position in the spoken chain for indicating relations being by-passed as belonging to substance and not to the relational pattern. But it should be clear that if mankind had resorted to visual signs for inter-human communication, the analysis of experience, prior to its transmission, would have been of a totally different nature. Functionalists (Martinet 1975: 26–29) do away with linearity in their two-dimensional visualizations. But they do not mean thereby that the auditory nature of linguistic exchanges which imposes that linearity has no bearing upon the way man perceives the world.

A third common feature is the double articulation of utterances into significant units whose perceptible form is, in its turn, articulated into distinctive units. Many linguists, even among functionalists, are tempted to argue that one could distinguish between more than two articulations, such as that of significant units into semantic features and that of distinctive units into distinctive features, which no one denies. But what is essential is the distinction between what is significant and what is just distinctive. Here again, those who refuse to consider the written form of a language as an additional code could argue that ideographic writing systems do not go beyond a first articulation. But they would thereby forget that all ideographic systems must, at some point, have recourse to phonic, i.e., distinctive non-significant features.

By stipulation, we shall call 'a language' any form of human behavior that shares the above-mentioned three features. Arguing that the validity of our assertion has not been checked for all the past, present, and future 'languages' of the world does not make sense because, by means of our stipulation, we actually redefine the term 'language' and decide that it shall not be used in reference to any object that would not conform to our definition. All scientific terms should of course be carefully redefined.

Some linguists take exception to our stipulation by arguing that it leaves out some features that are obviously present in what all would agree to call a language, as, for instance, 'intonation,' or more generally prosodic or suprasegmental traits. The answer is that 'vocal,' in reference to linguistic utterances implies 'voice' which, in its turn, implies 'melodic curve,' which takes care of 'intonation.' Intensity and duration are similarly implied. For what purposes individual languages make use of the ingredients is not of concern here.

Our stipulatory, or should we say 'axiomatic,' approach takes care of what it has been fashionable to refer to as 'universals.' It would defeat our purposes to posit universals which are not implied in our formulation. Whatever does not conflict with it cannot be excluded from a language, be it positive or negative. For instance, the assumption that the distinction between noun and verb is universal cannot be made because it is not implied by our definition. It should go without saying that being rendered in English by means of a verb or a noun does not make a foreign significant unit a verb or a noun. In other words, what is relevant in language A does not make it relevant in language B.

3. Functional Grammar

Functional grammar is concerned with the identification, classification, and functioning of significant units. It presupposes a phonology whose main task is the identification of distinctive units. It precedes a study of the lexicon, i.e., an examination of each significant unit, not taken care of in the grammar, in its relations to the analysis of man's experience.

The minimal linguistic unit combining an acoustically perceptible form and a reference to some aspect of experience is called a 'moneme.' Utterances are analyzed into monemes by means of the commutation test which consists in looking for and comparing utterances that differ only on account of one minimal meaningful segment. A meaningful element is said to be minimal if it cannot be further analyzed into such segments. Many linguists refer to minimal significant units as 'morphemes.' But it is preferable to avoid this term which suggests form rather than meaning. Once form has played its identifying role, only meaning should count as implied by the term 'significant.' The linguistic ideal would seem to require that each meaning should always correspond to one and the same form and that one and the same form should always correspond to the same meaning. Actually, it frequently happens that the same meaning assumes different forms in different contexts as, e.g., *-s* in *cows* and *-en* in *oxen* with the same meaning 'plural,' and the same form assumes different meanings, as in *last* $\neq$ *first* and *last* = *to endure*. Here, *-s* and *-en* stand for the same moneme, $last^1$ and $last^2$ for different ones.

Among monemes identified by means of the commutation test, a first distinction is to be made between joint and free monemes: *farm* is free in *the farm was sold*, but joint in *farmer*, *farm-yard* and *farm hand*. A free moneme refers to a definite element of experience; a joint moneme, as such, does not. A combination of joint monemes is called a 'syntheme.' Free monemes and synthemes may receive determinations: *a big farm*, *a large farm-yard*, *a strong farm hand*; joint monemes cannot. Synthemes commute with free monemes and maintain the same relations within the utterance. Therefore what is said henceforth about monemes applies to free monemes and to synthemes as well. Complex monemes, such as participles, that share the compatibilities of different classes or present their own set of compatibilities are said to be 'parasynthemes.' Since individual speakers are free to make new synthemes according to certain patterns, 'synthematics,' which partially coincides with traditional 'word-building,' belongs to grammar as an aspect of the functioning of significant units.

Speakers are not free to combine monemes at will if they want to be understood. The appearance of some type is often dependent on the presence of some other type. In such a case, the monemes of the former type are said to be 'subordinated' to those of the latter. Where no such restrictions exist, the monemes that are found to maintain the same relations to the context are said to be 'coordinated.'

Utterances consisting of several monemes are normally found to center around one of them, or two or more coordinated ones, which can be designated as the nucleus, the rest being its satellites. In *I worked on my father's farm*, the nucleus is *work-*; *I* enjoys a special status because its elimination would destroy the utterance. It is traditionally interpreted as what is talked about and accordingly called the 'subject.' Both *-ed*, as the form of the preterite moneme, and what follows are dispensable satellites. In *my father's farm*, *farm* acts as the nucleus of its satellite *my father's*. A specific designation was needed for the nucleus of the complete utterance. The term 'predicate' was chosen for that purpose although it originally covered, not only the nucleus, but all its satellites except the subject.

What is called a 'verb' is a moneme which is only used as a predicate (or a predicatoid, i.e., the nucleus of a subordinate clause or, in other words, a full statement functioning as the satellite of another). Predicates are not necessarily verbs: in Russian *dom nov* 'the house is new,' the predicate is *nov* 'new,' but *nov* can function as a satellite in *nov-yj dom* 'new house.'

Some monemes never act as nuclei, but always as satellites. They are called 'modalities' or 'modifiers.' They often appear as grammatical endings, such as the *-ed* of *worked*. But *my*, in *my father's*, is also a modality. A modality requires, of course, the presence of a nucleus.

A 'relator' (or 'functional') is a moneme that connects two monemes or moneme clusters, either coordinated or subordinated. Traditionally, coordinators such as *and*, *or*, *but* are called conjunctions; subordinators are conjunctions when they connect two clauses. They are prepositions, postpositions, or case endings elsewhere. A relator obviously requires the presence of two or more than two monemes or moneme clusters.

Another way of expressing the relation between nuclei and satellites is the use of 'determine' or its derivatives: the nucleus is said to be determined by its satellites and the satellites are the determinants of the nucleus.

Monemes are said to be compatible with one another if they can meaningfully combine in an utterance. This does not necessarily imply contiguity: *farm* is found to be compatible with the article *the* in *the rich and big farm*.

Moneme classes are established on the basis of their mutual compatibilities. They are found to differ from one language to another. This was not generally assumed for the traditional parts of speech. Describers should not be led astray by the translations into their own language of the utterances they are analyzing. What appears as an adjective in a translation may well be a verb or a noun in the original. If, as has just been done here, the terms 'adjective,' 'verb,' and 'noun' are retained in reference to the moneme classes of a new language, they should be carefully redefined after a complete survey of the compatibilities of each class. It should not be assumed that all languages distinguish between adjective, verb, and noun classes.

Monemes belonging to a class are apt to be transferred to other classes: by dropping the moneme which a relator connects with the rest of the utterance, the relator ceases to be one and becomes the determinant of what precedes, as in *go through*, *stand for*; *blind* remains an adjective when it designates those who cannot see, but it is transferred to the noun class in *the blinds of the windows*. Cardinals, in French, that are constantly transferred from one class to another, may as well be considered as forming a class of their own.

Beginners should be warned against assuming the existence of a moneme when a formal distinction does not contribute any new information. This is the case of gender in a language like French. Except in some derivatives, the feminine gender, in that language, is not manifested in the noun itself, but in its determinants, articles, or adjectives. The word *classe* 'class' happens to 'be' feminine. All French speakers know that, accordingly, it requires feminine concord, which means that the use of the article *la* instead of *le* contributes no information whatsoever. Therefore the feminine gender is not a moneme. In the same language, there is a female sex moneme which appears as *-esse* in *poétesse* 'female poet' or as *-ière* in *épicière* 'female grocer' as opposed to *épicier*, her male equivalent. But since the gender mark, in the adjective *entière* 'entire' versus *entier* is homonymous, traditional grammarians are apt to confuse feminine gender, a morphological accident, and female sex, a full moneme.

In the same vein, no moneme should be posited for a gap in a grammatical paradigm. In a language with a past tense moneme and a future tense moneme, one is tempted to assume the existence of a present tense moneme. But, in such languages, it is frequent that what is called the 'present' is formally identical with the bare stem of the verb, i.e., the verbal moneme itself. Should that form be restricted to the expression of events taking place precisely when the speech is being delivered, one would have to posit a present moneme with the positive meaning 'present' even if its form is zero. But, as a rule, the bare stem is also found in reference to past and future events (cf. *call me before you come*) and generally when no definite time period is implied. In French, for instance, where personal endings are added to the bare stem in the so-called 'present tense,' no present tense moneme should be identified. In English, where the present tense is positively characterized by 3rd pers sg *-s*, the existence of a present tense moneme could be argued.

The same remark applies to the singular number in languages where the bare stem is used for the species as well as for a unit, e.g., *man*, *the lion*. The same could be said about the indicative mood which, again, normally coincides with the bare stem and just points to the existence of an event. But a zero form does not necessarily coincide with the absence of information: in Russian, the endingless *ryb*, among full forms such as *ryba*, *ryby*, harbors three distinct monemes with the meanings of 'fish,' 'plural,' and 'genitive.' Here again, what counts, when dealing with significant units, is meaning.

Generally speaking, concord amounts to repeating the same information in different places in the utterance, as, e.g., in Latin *bonorum vinorum* 'of good wines' where 'plural' and 'genitive' appear twice, but are meant once. In the case of French gender, the *-a* of the article *la* is properly a part of the 'feminine' moneme *classe*. It is precisely what distinguishes *la voile* 'the sail' from *le voile* 'the veil.' In such cases, one operates with the discontinuous form of a moneme or, for short, a discontinuous moneme.

It is quite frequent that the commutation test confirms the presence of a moneme, but in such conditions one is not in a position to ascribe to it a definite segment of the utterance. This applies to Latin *vinorum* where it cannot be discerned which parts of the total should be ascribed to 'wine,' 'genitive' or 'plural' respectively. In such cases, the forms of the monemes are said to be 'amalgamated.'

These various accidents should not prevent us from operating with monemes and incite us to resort to the traditional notion of 'word.' Even if it may prove useful in the description of a language like Latin, it cannot be accurately defined in general linguistics except in reference to the written forms of languages that make use of an alphabet. The closest one can get to pinning down the 'word' in the basic spoken form of language is by starting from the grammatical phrase, or syntagm. This consists in a nucleus with its various determinants and, as the case may be, a relator connecting it to the rest of the utterance. The largest grammatical phrase is the sentence where whatever sounds as a relator (e.g., *but*) is actually transferred to some adverbial class, i.e., used as a determinant of the predicate. As an illustration of a full grammatical phrase, with all its ingredients, one can choose *of the large gardens* where *garden-* is the nucleus, *large* is a determinable determinant (as in *very large*), *the* and *-s* are modifiers, and *of* is the relator. The term 'syllemma' has been proposed for a grammatical phrase limited to its nucleus, its modifiers, and its relator. If the determinable determinant *large* is removed, the grammatical phrase is reduced to the syllemma *of the gardens*. Now, if, in a syllemma, the modifiers and the relator come before the nucleus, they are likely to be words in their own rights, as is the case, here, with *the* and *of*. If they come after, they will probably constitute a single word with the nucleus, as in *garden-s*. In *havernes*, the Danish equivalent of our syllemma, both the modifiers, *-er-* 'plural' and *-ne-* definite article, and the relator *-s* follow the nucleus, and the syllemma corresponds to what is called a 'word.' The reason for this difference of treatment is clear: significant segments are normally identified in speech before their final phonemes are uttered. It is therefore essential to preserve the identity of the initial part of each of them by avoiding amalgamation with what precedes, whereas that of the final part is less important and offers less resistance to blurring. One could be tempted to define the word as a syllemma where determinants and relator follow the nucleus. But there are exceptions like Greek *elabon* 'I took' written as a single word in spite of the initial position of the modifier *e-*, a past tense moneme. Besides, such 'words' as *of* or *the* being modifiers cannot be identified as the nuclei of syllemmas. It should be clear that a functional grammarian is under no obligation ever to operate with the notion of syllemma.

Syntax is often conceived as dealing with the combinations of significant units (usually conceived as 'words') in utterances. Functionally, it is best understood as the study of how the hearer can manage to derive a meaning from a succession of significant units, or, in other terms, to reconstruct, beyond the articuli of speech, the experience the speaker wants to communicate. It is, from the start, clear that relators like *-s* in *man's speech* or *of* in *the speech of man* should play a great role in such matters. But plain contiguity is often resorted to: the identification of a moneme as belonging to a certain class may suffice to indicate the nature of its relations to its neighbors: *good*, as an adjective, is known to qualify a following noun; *-ed* is known as a modifier of the verb to which it is tagged, and so forth. In other words, the first chapter of syntax will consist in the inventory of moneme classes including, of course, all the compatibilities of each class.

This will suffice in a number of cases. But stating that, in English, verbs and nouns are compatible, the former as a nucleus, the latter as a satellite, does not give all the required information, because the mutual relations between verb and noun vary from one utterance to another and within the same utterance: the noun may act as a subject, an object, a beneficiary, an indication of time, space or manner, and so on. These different functions may be indicated by means of the respective positions of verb and noun, e.g., the noun in subject function appearing before and that in object function after the verb. But this will have to be eked out by means of some relators, also referred to as 'functional indicators.' Another possibility is to coordinate several verbs, each one requiring its own determinants, as when *I write a letter to my son* becomes *I letter write give my son*. But, of course, *give*, in such a case, may be interpreted as resulting from a transfer from the verb class to that of subordinating relators.

Within a class, the nature of possible relations varies from one moneme to another. This is illustrated by the traditional distinction established between transitive and intransitive verbs. But in order to be exhaustive, one shall have to tell which verbs can combine with a beneficiary (e.g., *to give*), which verbs do not need a real subject (e.g., *to snow*) because the action referred to is conceived as self-sufficient, which verbs cannot appear without an object (e.g., *to put*), and so forth. In short, each moneme likely to act as a nucleus can be expected to maintain different relations with its satellites. The listing of all of these is best left to the lexicon, the grammarian, as such, being satisfied with the identification of the different types of relations for each moneme class.

As pointed out above, the form of a moneme may vary from one context to another: *keep* appears as *kep-* before the preterite moneme /-t/, *have* is reduced to *ha-* before the /-d/ variant of the same modifier; *go*+the preterite appears amalgamated as *went*; the genitive moneme of Latin presents ten different avatars. Concord is widely responsible for the formal variations of monemes. As was suggested before, the material changes determined by concord should be ascribed to the moneme whose choice had caused them. This rule, if strictly applied, would not only ascribe the *-a* of the definite article to the feminine noun that it accompanies, but also every additional element that the choice of such a noun entails in the determining adjectives: if the French moneme for 'chair' is supposed to assume the form /-aʃɛ/ in *la chaise*, it will become /-a . . . -dʃɛ/ in *la grande chaise* since no /d/ is sounded in the masculine *grand*. Of course, once such variations have been identified as zero for the communication of information, one may be allowed to list the ones implied by the feminine gender of nouns in the chapter devoted to adjectives. In a similar way, using declensional patterns is probably the most sensible approach to the presentation of the forms of Latin cases. But one should not forget that the *-ibus* of *civibus* and the *-is* of *dominis* are linguistically identical, viz. datives and ablatives.

All of this belongs to the chapter of morphology. The unfortunately widespread opinion that morphology involves, and even consists in, the study of the relations between the components of the 'word,' just like syntax takes care of the relations between 'words,' should by all means be denounced as a misinterpretation of the contents of classical grammars.

Morphology, or accidence, is nothing but the presentation of the formal accidents that may complicate the task of youthful or adult learners, but do not have the least bearing upon the information utterances are meant to convey. Formal accidents may of course be prosodic as well as phonematic and also include deviations in the respective positions of monemes.

The insistence on a strict distinction between morphology and syntax as respectively negative and positive from the point of view of the success of communication and ease in the handling of the linguistic tool does not entail that each should be dealt with in two different chapters. The presentation of each class should include a thorough survey of the various accidents every one of the monemes involved may incur. But this should by no means exclude the possibility of dealing with some morphological facts prior to the listing of the classes. Such features as German Umlaut that affects the morphology of several moneme classes are best presented in an introductory part of the grammar, and referred to later when dealing with specific problems such as plural of nouns, personal inflexion of verbs, and so on. This means that the way morphology will be introduced in the grammar will depend on the nature of the formal accidents in the language at issue.

Grammar dealing with significant units, it is to be expected that semantics will not be absent from it. The problem is how much of it will be handled here and how much will be left for the lexicon. Spelling plays a role in this connection because written 'words' will all be included in the lexicon, but endings will be left out. This conflicts with the functional approach which implies that modifiers and relators be handled together irrespective of whether they appear as 'words' or as parts of 'words.' Linguistic reality, as distinct from its formal vagaries, demands that, e.g., relators should be handled together and confronted, whatever form they may assume: endings, prepositions, or respective position. With this reservation, there is no reason to depart from the habit of dealing, in the grammar, with the semantic values of the units belonging to classes where they can be exhaustively listed and leaving those of others to the dictionary. In the same way as linguists distinguish in phonic matters between phonetics dealing with objective reality irrespective of its function, and phonology where matters are handled in reference to communicative relevance, it is recommended to distinguish between semantics proper where differences of meaning are considered irrespective of whether they correspond to some formal difference, and axiology where only relevant significant features are retained, namely those that are orally perceptible.

The describer of a language cannot hope to give an exhaustive presentation of all its varieties. Whether he should concentrate on an idiolect or a sociolect or try to cover a number of different usages depends on what his aims are. He might choose to concentrate on the spoken practice or cover the written form as well, and the problem arises of whether the two aspects should be dealt with separately, particularly in the case of an ideographic writing system. But even with an alphabetically written language it may be advisable to present two different analyses, at least for some of the moneme classes. In standard written French, personal endings may differ from one verb to another. For present indicative 1., 2., 3. sg, there is for *dorer* 'to gild,' *-e*, *-es*, *-e*, in *je dore*, *tu dores*, *il dore*, but, for *dormir* 'to sleep,' *-s*, *-s*, *-t* in *je dors*, *tu dors*, *il dort*. In daily oral practice, all these endings are silent and all the forms sound /dɔr/ (note, with linking, the same pronunciation /dɔrtil/ for *dore-t-il*? 'does he gild?' and *dort-il*? 'does he sleep?'). This means that one has to operate, in one case, with two different conjugations, in another, with verbs with the same radical throughout versus verbs with varying radicals: cf. e.g., *nous dorons* 'we gild' /dɔr-/ versus *nous dormons* 'we sleep' /dɔrm-/. Here is a situation where the distinction between spoken and written coincides with two different levels, one more solemn and one more spontaneous. But these are not necessarily confused: to familiar and slangy forms normally correspond written renderings, and rhetoric and ritual usages often present some specific oral features. All of this goes beyond grammar, involving, as it does, phonetics, phonology, and vocabulary, but it includes it.

Bibliography

Bühler K 1931 Phonetik und Phonologie. *Travaux du Cercle Linguistique de Prague* **IV**

Martinet A 1962 *A Functional View of Language*. Clarendon Press, Oxford

Martinet A 1964 *Elements of General Linguistics*. Faber, London (Transl. by Palmer E)

Martinet A 1975 *Studies in Functional Syntax*. W. Fink, Munich

Martinet A 1977 Some basic principles of functional linguistics. *La linguistique* **13(1)**: 7–14

Martinet A 1979 Grammatical function. In: Allerton D J, et al. *Function and Context in Linguistic Analysis*. Cambridge University Press, Cambridge

Martinet A 1981 Synthematics. *Word* **31(1)**: 11–14

Martinet A 1982 Grammatical phrases and lexical phrases. In: *Linguistics and Philosophy: Essays in Honor of Rulon S. Wells*. Benjamins, Amsterdam

Martinet A 1983 What is syntax? In: *Ninth* LACUS *Forum*. Hornbeam, Columbia, South Carolina

Martinet A 1985 *Syntaxe générale*. Colin, Paris

Mulder J W F, Hervey S 1980 *The Strategy of Linguistics*. Scottish Academic Press, Edinburgh

---

American Structuralism

John G. Fought

The main focus of this article is a theory of language and a corresponding view of linguistics associated primarily with Leonard Bloomfield (1887–1949), to a lesser extent with Edward Sapir (1884–1939), and with their students. Some key elements of their views, however, can be found in the work of Franz Boas (1858–1942), the principal founder of modern American anthropology and the mentor of generations of linguistic anthropologists, including Sapir. It is less well known that Boas was also a friend and mentor of Bloomfield (cf. Bloomfield 1943).

The history of American structural linguistics is often sketched as a mostly linear development from an early, intuitive, anthropological, Boas–Sapir style to a later, more explicitly formal Bloomfieldian style exemplified by Bloomfield himself and his students (cf. Hymes & Fought 1981). This article emphasizes that Sapir and Bloomfield, who had similar backgrounds and were only three years apart in age, also had fundamentally similar approaches to linguistics and, further, that both were strongly influenced by Boas. Finally, it suggests that the main discontinuities in theory and practice within the American structuralist community appeared later, between the group made up of Boas, Bloomfield, and Sapir together with certain of their early students and followers and the younger group of distributionalist structuralists rather misleadingly known as 'Bloomfieldians,' including Bernard Bloch, Martin Joos, Henry Lee Smith, George Trager, and Zellig Harris, whose influence was greatest in the late 1940s and 1950s.

The principal disciplinary contributors to the formation of American structuralist linguistics were the mature fields of dialectology and comparative Indo-European philology and the linguistic side of the young discipline of anthropology. From the first of these came an emergent notion of language structure, exemplified, for instance, in the doctrine of regular, conditioned sound change in comparative philology and of regular phonetic correspondence in dialectology; from linguistic anthropology came an emphasis on the study of spoken language in use within the speech community and a relativistic view of linguistic and cultural categories.

Native American languages have had an important role in giving American structuralist linguistics its distinctive character. The number and diversity of languages that continue to be spoken in North America in Native American speech communities is much greater than those that comprise the linguistic landscape of Western Europe. Native American languages, poorly documented and relatively accessible, have presented a continuing challenge and opportunity to North American scholars.

1. Franz Boas

In the last quarter of the nineteenth century, Boas developed an approach to linguistics that was shaped by his field studies of Native American languages and cultures. Unlike the leaders of European structuralism, he had no academic training in philology, though he apparently studied some standard works on his own (Stocking 1974: 455). His approach to these unwritten languages called for the elicitation, transcription, and analysis of large quantities of spoken discourse of ethnographically significant content. It emphasized proficiency in phonetic transcription that achieved phonetic accuracy but also reflected sound categories relevant to the speakers of the language. In 1889, he published a seminal paper, 'On alternating sounds,' in which he argued that certain apparently variable speech sounds reported for Native American and other 'exotic' languages (such as the range of sound types including both *r* and *l* that make up a phonological unit in Japanese) were actually artifacts of the observers' own categorizations of their perceptions rather than of the subjects' 'primitive' sound systems. Indeed, this was so much the case that the native language of an observer could in some instances be determined from a careful examination of such reports.

Wells (1974) summarized this paper and put its argument in the context of the linguistics and anthropology of the time. Stocking wrote (1968: 159) that it is 'impossible to exaggerate the significance of this article for the history of anthropological thought.' It is

> . . . much more than a critical or methodological exercise. It in fact foreshadows much of Boas' later criticism of late nineteenth-century racial thought and his work in physical anthropology. More importantly, it foreshadows a great deal of modern anthropological thought on 'culture.' At least by implication, it sees cultural phenomena in terms of the imposition of conventional meaning on the flux of experience. It sees them as historically conditioned and transmitted by the learning process. It sees them as determinants of our very perceptions of the external world. And it sees them in relative rather than in absolute terms. Much of Boas' later work, and that of his students after him, can be viewed simply as the working out of implications present in this article.

It must be emphasized that what Boas (and Stocking) say here of culture applies equally to language. It was Boas who made linguistics one of the 'four fields' of anthropological study, along with archaeology, cultural anthropology, and physical anthropology. One especially salient feature of American structuralism traceable to his influence is relativism, the view that cultural and linguistic categorization is imposed on experience in ways that differ, sometimes radically, from culture to culture and from language to language and that these different categorizations have equal claims on the attention of science. In this approach to linguistic description, pioneered and taught by Boas to generations of students, methodological primacy was given to fieldwork as a source of data, that is, to directly observed and carefully recorded speech and behavior, and to methods of analysis and description intended to be free of preconceptions about the nature and interrelationships of specific fundamental categories. Boas emphasized the importance of collecting ethnographically relevant text material by transcribing it phonetically and explicating its form and content with the help of native speakers. By systematically paraphrasing and altering portions of the text after elicitation, and observing the covariation of the meanings and forms in the text, Boas and his students worked out the phonological and grammatical structures of the target languages. 'Perhaps his greatest contribution to science,' wrote Bloomfield (1943: 198) in his deeply felt obituary of Boas, ' . . . was the development of descriptive language study.' And further, 'Boas amassed a tremendous body of observation, including much carefully recorded text, and forged, almost single-handed, the tools of phonetic and structural description.'

For Boas and his first generation of students, much more than for anthropologists since, language lay near the heart of anthropology. Linguistic methods, therefore, were part of the foundation of anthropological training as he organized it. He communicated his emphasis on native classification by generalizing it from his view of linguistics; within linguistics, he extended his conception of the nature of language from its sources in phonology:

> As the automatic and rapid use of articulations has brought it about that a limited number of articulations only, each with limited variability, and a limited number of sound-clusters, have been selected from the infinitely large range of possible articulations and clusters of articulations, so the infinitely large number of ideas have been reduced by classification to a lesser number, which by constant use have established firm associations, and which can be used automatically. (Boas 1911: 21)

Notice first the equal weight given to sounds and ideas in this passage and the notion applied to both of structure emerging from social interaction: systematization through classification, constant use, firm associations, and automaticity. Later American structuralists, however, continued to pay particular attention to phonological structure in developing a model of language, both as a practical matter in analyzing and describing so many hitherto undocumented languages and as a theoretical tenet, whereby a model of structural elements and relations based on phonology was projected into other levels of structure. The structure of semantics, by contrast, remained a mostly anthropological concern.

Since native classifications are imposed on the raw stuff of experience and of language by individuals and are propagated through language use in everyday interactions, there is no reason to expect that different cultures will develop the same scheme of classification. Instead, variation in all aspects of structure from community to community is to be expected. Boas gave expression to this community-oriented relativism in a frequently cited passage from the introduction to the *Handbook* (1911: 39).

> We conclude . . . that in a discussion of the characteristics of various languages different fundamental categories will be found, and that in a comparison of different languages it will be necessary to compare as well the phonetic characteristics as the characteristics of the vocabulary and those of the grammatical concepts in order to give each language its proper place.

One offshoot of the linguistic version of cultural relativism was the interpretation of language in culture that came to be known as the Sapir–Whorf hypothesis. This topic has spawned a considerable literature of its own. Hoijer, in an influential symposium volume he edited on this topic (1954), traces this hypothesis to two paragraphs written by Sapir in 1929. The last sentences of each give the idea: 'The worlds in which different societies live are distinct worlds, not merely the same world with different labels attached,' and 'We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation' (Sapir 1929, cited in Hoijer 1954: 92). The original formulation claims significantly less than many later, oversimplified paraphrases, whose purport is that language predetermines rather than predisposes. In any event, the close kinship between this view of Sapir's and the corresponding relativism of Boas's linguistic anthropology is manifest.

This relativism implies that individuals may also differ from one another in their personal category systems in the same ways that communities do, but this individual aspect of relativism was kept subordinate in theory to the unity supposed to arise from sharing a common culture or a common language. The largely tacit agreement maintained among most anthropologists and linguists to leave individual variation out of the domain of theory and description, to leave it uncovered, as it were, by the doctrine of cultural and linguistic relativism, has had serious consequences for descriptive practice in both fields. In linguistics, this omission has been a textbook example of anomaly in the sense of Kuhn (1962). Some consequences of the omission of individual variation from structural descriptions are discussed below, in connection with Bloomfield's descriptive work on Algonquian.

A still later sequel to the Boas–Sapir approach to language in culture is the development within American anthropological linguistics in the late 1940s and early 1950s of a structuralist approach to semantics, known as 'componential semantics' and 'ethnoscience' (cf. Goodenough 1956; Lounsbury 1956, 1964). This approach, which simply applied the same analytical tools to meaning that had long been applied to sound, was in sharp contrast to Bloomfield's radically nonstructural view of meaning. This steadfast lack of parallelism between structuralism in language form and atomism in semantics remains the most puzzling aspect of Bloomfield's thinking. At times he came very close to adopting a structural view of semantics, but he apparently never took the final step. Writing in 1927, for instance (1927: 179–80), he evidently relied to some extent on dictionary meaning, even for grammatical formatives and categories. He mentioned numerical systems and botany and kinship terminologies as complex in their relationship to cultural and material realities, 'with troublesome refinements,' such as degrees of affection, respect, and the like. This is an amazingly exact prefiguration of the reasoning that led to structural analyses of these semantic domains, and also of the reaction against those analyses within anthropology when they finally came about 25 years later.

2. Edward Sapir

Both Sapir and Bloomfield produced a large body of published work, including collections of text and analytical studies on a number of Native American languages (see Mandelbaum 1949). Sapir worked especially on the Athabaskan and Uto-Aztecan families. He too published a general book on linguistics, *Language* (1921); like Bloomfield's, it is still in print. Sapir also developed an interest in psychology, which brought him into a close working relationship with Harry Stack Sullivan, whose view of psychology focused on social interactions; from this interest Sapir launched the anthropological subfield of culture and personality studies in the 1930s.

Sapir's and Bloomfield's styles of description are sometimes contrasted as 'item and process' versus 'item and arrangement,' to use terms later introduced by Charles Hockett; in another publication (1970), however, Hockett pointed out that the two models are equivalent in power and descriptive capability. Zellig Harris also noted that Sapir's model of language structure relied on notions of 'pattern' and 'configuration.' Sapir's model of language structure continues the use of processes as one among many of the features of Boas's system. Its reliance on processes rather than on the relational counterparts introduced in later theoretical works by Bloomfield and others is doubtless an important reason for the usual perception of Sapir as an antecedent of Bloomfield.

Sapir (1921: 61–62) listed six types of grammatical processes: word order, composition, affixation, internal modification, reduplication, and accentual differences (in stress and pitch). He explained that composition 'differs from the mere juxtaposition of words in the sentence in that the compounded elements are felt as constituting but parts of a single word-organism' (1921: 64). It is easy to misunderstand his rhetoric of feeling and organism as a kind of naive psychologizing. However, the examples that followed made it clear that compared with mere juxtaposition, semantic changes, stress patterns, and affixation to the compound stem are characteristic of compounds. As usual, Sapir writes of psychology and offers evidence from linguistics. Harris (1951a) commented on this.

> A detailed examination of Sapir's use of *psychology* and kindred words shows they refer not to some new forces within the individual which can affect his language, culture, or personality, but simply to the fact that the individual participates in linguistic, cultural, and personality patterns.

Sapir himself was explicit on this:

> The unconscious nature of this patterning consists not in some mysterious function of a racial or social mind . . . but merely in a typical unawareness on the part of the individual of outlines and demarcations and significances of conduct which he is all the time implicitly following.

This passage is also an important and eloquent expression of the Sapir–Whorf hypothesis.

One of the aims of his popular book was to classify languages in their patterns of use of the various formal processes as a means of expressing concepts and grammatical relations of different types. His treatment of affixation is an exemplary presentation in terms of process. Distributionalists wedded to item and arrangement descriptive styles often alleged that historical metaphor was inevitable with process descriptions, that process, in other words, always amounted to process through time. Harris did not accept this view:

> The difference between two partially similar forms is frequently described here as a process which yields one form out of the other. Thus when bases or themes have several vocalic forms, the various forms are said to be the result of vowel-change processes operating upon the base or theme (∂ 6:2, 22:28). The difference between a base and a base-plus-suffix is described as the result of the process of suffixation (∂ 6:1, 20:11). This is a traditional manner of speaking, especially in American Indian grammar (e.g., in the Handbook edited by Boas). It has, of course, nothing to do with historical change or process through time: it is merely process through the configuration, moving from one to another or larger part of the pattern. (Harris 1944: 199)

Although Harris never studied with Sapir, he read his work carefully and wrote penetrating appreciations of Sapir's collected writings and of Stanley Newman's study of Yokuts, as a representative of Sapir's mature style of description. He emphasized the importance of Sapir's notions of configuration and pattern in understanding the approach:

> The relations between elements in the configuration are always described in terms of the pattern. Therefore Newman says: 'In order to preserve that inflexible rule of Yokuts syllabic structure which does not permit the juxtaposition of two vowels, the glottal stop is interposed as a hiatus-filler between two vowels that should morphologically follow each other' (§ 1:13)[. . .]. Since the elements are observed only as parts of the system, and occur only in the positions which are mentioned when the system is described, one can picture the configuration as determining the nature of its elements (requiring or employing them): 'The strict vocalic and syllabic requirements of the base do not apply to the theme' (§ 12:1). (Harris 1944: 198)

As in Bloomfield's work, both forms and meanings are related to each other as elements of the pattern: 'The configuration is treated as though it were a pattern of meanings as well as, basically, of forms. Summaries are offered of the meanings of various formal parts of the pattern' (Harris 1944: 199).

3. Leonard Bloomfield

The early career of Leonard Bloomfield was representative of the overall development of linguistics as a discipline in America. His early writings, including his first general book, the *Introduction to the Study of Language* (1914), and his reviews of Braune (1912) and Wundt (1913), show very strong influences from contemporary European work.

However, this same period in American linguistics was also marked by the appearance of descriptive studies of Native American and other non-European languages. Under the editorial and intellectual direction of Boas, the *International Journal of American Linguistics* began to appear in 1917, dedicated to Native American languages; a carefully orchestrated campaign of field studies of selected languages by Boas's closely supervised students resulted in sketches and longer descriptions collected and published in the three volumes of the *Handbook of American Indian Languages* (1911, 1922, 1934). One of these studies was Sapir's landmark dissertation on the Takelma language of Oregon (completed by 1909, published in 1922). Also at about this time, Bloomfield began descriptive linguistic work on Fox by studying texts collected and published by others (Hockett 1970: 94n). Very soon after, he began an analysis of Tagalog, based on elicitation and transcription of material from a native speaker then studying at the University of Illinois. After about two years of part-time work on the language, he published *Tagalog Texts* (1917), his first major venture outside the Indo-European language family and an already mature exercise in the text-based descriptive technique of the time. By some at least, this study is still regarded as the best available description of a Malayo-Polynesian language. During the 1920s, he further shifted the target of his descriptive work, concentrating thereafter on the Algonquian languages.

3.1 *Bloomfield's Theoretical System*

A characteristic tenet of American structuralism virtually absent from European linguistics is the primacy of the sentence over the word as the basic analytical element. This was asserted by Boas (1911: 23): 'Since all speech is intended to serve for the communication of ideas, the natural unit of expression is the sentence; that is to say, a group of articulate sounds which convey a complete idea.' For both Boas and Bloomfield, this perspective presumably drew support from the analytical techniques worked out for describing languages whose combinations of meaningful elements straddled the range of complexity from word-like structures to sentence-like structures. Sapir (1921: 32–33) takes a broader view of this question, representing the morpheme and the sentence as elements and a range of intermediate formations as more or less relevant to the configuration of a particular language. Bloomfield gave the primacy of the sentence much clearer expression after explicitly rejecting his earlier Wundtian view of the word as fundamental (cf. 1914[1970: 43]), pointing out the inconsistent and arbitrary aspects of conventional word division in European languages, and the lack of clear criteria of any kind for word division in Native American languages (Bloomfield 1927 [in Hockett 1970: 180–81]). Moreover, Bloomfield put this notion into a carefully articulated theoretical and operational context.

3.2 *The Introduction to the Study of Language (1914)*

The *Introduction* of 1914 feels like a very different book from the *Language* of 1933. The most striking difference between them is in the role played by psychology. The earlier book is a 'traditional' treatment of language, in which language forms are presented as expressing mental acts. The later book is 'formal,' in that language forms are themselves the focus, with types of semantic elements established in correlation with the linguistic forms but left almost completely empty. While this difference affects the exposition in many significant ways, it is the theoretical consequences that were presumably most important for Bloomfield and were certainly the most important in shaping reactions to his later work. In *Language*, Bloomfield advocated basing linguistic analysis on the overt forms of language, using their similarities and differences as the guide to organizing and presenting the grammar and syntax and to establishing the fundamental categories of the structure of each language. It was this, more than anything he said or did about the meaning of linguistic forms or the psychology of language, that ran directly counter to the familiar and dominant pattern of thought in linguistics. For others, as for the younger Bloomfield, it was the presumed underlying mental activities that gave shape and significance both to what was said and to the academic study of language. Moving these putative mental acts away from the focus of linguistics and concentrating instead on overt forms as both the target of analysis and the decisive manifestation of language structure may have been the real motivation for the persistent charges, so puzzling to Bloomfield, that he ignored meaning. His change in orientation toward psychology in linguistics must have taken place not long after the 1914 book was written. It was probably due to several factors; the stimulus of independent descriptive field work in the Boas style and the personal influence of Boas were likely to have been among the more important. Weiss's behaviorist psychology eclipsing the influence of Wundt's system on Bloomfield was also important but must have had its impact somewhat later, after his move to Ohio in 1921.

In any event, as Hymes & Fought (1981) argued, his linguistic practice was scarcely affected by this change in outlook. Bloomfield's approach to linguistics was formed very early in his career, in nearly its full power and generality, but it could only emerge fully through descriptive work. For instance, Moulton remarked (1970: 516) on the courage (and seeming arrogance) of the opening paragraph of 'Etymologisches' (1912), a paper based on Bloomfield's dissertation on 'secondary ablaut' and published in German in the premier Germanistic journal when he was only 24. In this paper, Bloomfield stated bluntly that previous treatments of the topic were guilty of either of two errors: treating the vowel alternations of the specific vocabulary sets as instances of sound symbolism or of ad hoc sound laws. Though 'ablaut' patterns of root-vowel alternation are very common in the Germanic vocabulary, comparisons show that many do not date back to proto-Germanic times. Instead, the newer sets of forms were modeled analogically on the older patterns, an example of the 'creative' uses of language to which Bloomfield turned a number of times.

3.3 *Language (1933)*

The descriptive theory of grammar and syntax expounded in Bloomfield's *Language* (1933) was hierarchical and relational, with elements of form at each level paired with elements of meaning. His methodological precepts made it clear that the formal elements were paramount and the meanings interpretive. Nowadays, the architecture of his theory may seem deceptively familiar in outward appearance. Primary phonemes made up morphemes; morphemes were free or bound, making up words and phrases; these in turn made up constituents and sentences, these last defined (following Meillet) as maximum free forms. To many of his influential contemporaries, however, the book was shocking, despite its evident borrowings from traditional grammar and from the Pāṇinian tradition of Indian grammar. A closer look at the system outlined in *Language* will help to show why; it is also helpful to compare the less complex theoretical systems of later American structuralists with Bloomfield's to see what features of his system they dispensed with and what they changed.

In his system, there was a hierarchy of grammatical forms as well as the bound and free morphemes; like them, each grammatical form was paired with a semantic unit. Thus, it was not the morphemes themselves that made up grammatical forms; rather, they were the substance of those forms. Bloomfield identified four types of elements of grammatical form, or 'taxemes': these were 'modulation,' 'phonetic modification,' 'order,' and 'selection.' Modulation was the use of secondary phonemes—features of stress, pitch, and intonation—which later, in other structuralist approaches, came to be called suprasegmental phonemes. Phonetic modification was a change in the primary (i.e., segmental) phonemes of a morpheme. Morphemes, for Bloomfield, were composed of primary phonemes and had a single phonemic shape except under 'sandhi,' that is, when occurring with taxemes of modulation or phonetic modification. Taxemes are analogous to phonemes in that they are meaningless elements whose combinations are meaningful. These combinations are 'tagmemes.' Thus, phoneme is to morpheme as taxeme is to tagmeme; just as morphemes are paired with 'sememes,' so tagmemes are paired with 'episememes.'

Bloomfield used the utterance *Duchess!* of the lexical form *duchess* to illustrate his analysis of grammatical form. Each utterance, he emphasized, contains at least one grammatical form; these are arrangements of phonetic (i.e., lexical) forms, not mere naked occurrences of them. His phonemic representations, though interesting, are not the main point here: he transcribed *duchess* ['doces], and its constituent lexical forms *duke* and *-ess* were [djuwk] and [es]. A taxeme of selection establishes the specific form class—subclass of male personal nouns—occurring with *-ess* and the co-occurrence with *-ess*; their sequence is established by a taxeme of order. A taxeme of modulation gives heavy stress to the noun and leaves the affix unstressed. Ironically, in view of later developments, Bloomfield and Noam Chomsky both place stress assignment rules within grammar. Finally, a taxeme of phonetic modification replaces the 'compound primary phoneme' [juw] of [djuwk] with [o], as Bloomfield represented schwa, and the [k] with [c]. These, together with the taxeme of exclamatory final pitch and the taxeme of selection of a substantive expression, make up the utterance *Duchess!*. In this way, every phonological, morphological, and grammatical aspect of the utterance is accounted for.

This system is like the Boas–Sapir model in that selection, modulation, and phonetic modification are used as if they were processes; Bloomfield describes them as taxemes, however, as elements of form, using relational rather than process terminology. The affixation of *-ess*, for instance, is achieved by a taxeme of selection of a form class and a taxeme of order, not by a process of affixation. Later models of grammar developed by distributionalists (especially Harris) minimized or eliminated these higher order grammatical forms, dealing instead entirely with arrangements of one or more morphemes, some of them grammatical in meaning, some lexical, and some having both kinds of function. As Wells (1963) noted, Harris reduced Bloomfield's four types of grammatical form to one: order.

Bloomfield's episememes, never used in his own practical work, had no counterpart at all in the later model. The *Duchess!* example is also accompanied by a paragraph on semantics that is so typical of his theoretical treatment of meaning that it deserves to be quoted in full (1933: 168):

> If some science furnished us with definitions of the meanings of the units here concerned, defining for us the meanings (sememes) of the two morphemes (*duke* and *-ess*) and the meanings (episememes) of the three tagmemes (arrangement of *duke* and *-ess*; use of exclamatory final pitch; selection of a substantive expression), then the meaning of the utterance *Duchess!* would be fully analyzed and defined.

Bloomfield was a careful writer indeed. The science he mentioned here was not linguistics. He tenaciously held the position that linguistic meaning awaits an exhaustive account of impersonal reality, to be furnished by natural science. Nothing less would be satisfactory. This passage also furnishes an excellent example of the deliberate Pāṇinian concision of Bloomfield's writing. He had noted explicitly earlier (1933: 166) that tagmemes are composed of taxemes, just as morphemes are composed of phonemes. This relationship is implied but not mentioned here by first stating that there are three tagmemes, and then by identifying each of the features of grammatical form in the discussion of the example in such a way that we can see it is a simple taxeme. Consequently, each of these units is a tagmeme made up of a single taxeme.

Bloomfield placed both modulation and phonetic modification within grammar, outside of morphology. Later American structuralists dealt with what he called phonetic modification as a part of morphology, namely, 'morphophonemics.' About the specific grammatical functions of suprasegmentals most had relatively little to say. The explicit identification of these as elements of grammatical form within a system in which individually meaningless components form meaningful combinations is generally absent from the writings of later structuralists. They treated syntax in terms of morpheme order and selection alone. In these later works, grammatical form is a kind of epiphenomenon of combinations of morphemes; all or nearly all meaning is associated with individual morphemes.

Bloomfield's separation of form and meaning into parallel hierarchies was either rejected or misunderstood by Kenneth Pike, whose system of structural linguistics, called Tagmemics, branched off from a fundamentally Bloomfieldian approach on this issue. Pike's system closely associates each form with its meaning but uses a familiar stock of grammatical functions and categories with which each form class (a filler class in tagmemics) is also associated. Except for the lack of relativism about the fundamental categories, the system is like Bloomfield's in the prominence it gives to named constructions and their grammatical meanings (see *Tagmemics*).

There is another parallelism in Bloomfield's system as well, that between word-formation and sentence-formation, or morphology and syntax. The classification of forms in each is more elaborate than the traditional typology of simple, complex, compound, and compound-complex sentences, but it does include such types. Like many American structuralists, Bloomfield paid considerable attention to morphology both in his theorizing and in his descriptive work. There was an obvious reason for this, namely, that the languages he was most concerned with—the older Germanic and the Algonquian language families—had abundant morphologies, compared with that of modern English.

3.4 Bloomfield's Descriptive Linguistic Work

The theoretical system outlined by Bloomfield does not fully prepare the reader for the particular uses he made of it in his descriptive work. It does not presuppose any particular scheme of morphological and grammatical categories. These are expected to arise out of the analysis of forms and meanings in each language. In the analysis of Tagalog, for instance, there are no nouns or verbs. Instead, categories of expressions are built up directly from the formal elements of the language as he segmented and interpreted them. What is most striking about the morphological and syntactic analyses of Tagalog in the *Texts* is their accessibility and apparent simplicity. This is even more striking in the later and much briefer *Outline of Ilocano Syntax* (1942). The descriptive statements are ordered by generality, with the most general given first and the exceptions organized under it, in the method followed by generations of Indo-Europeanists and traditional grammarians as well. There is a straightforward mechanism for supporting cross-references but almost none of the often elaborate notational and classificatory apparatus of later structuralists or of the equally obtrusive and abundant notional terminology of traditional general grammar, as found, for instance, in Bloomfield's own *Introduction* of just three years before. Nevertheless, some major categories are carried forward from that work: the same three major grammatical relations of 'attribution,' 'predication,' and the 'serial relationship' are found in both. Instead of referring to forms by means of a system of hierarchical category labels, however, as many did and still do, Bloomfield cites the forms themselves, often mentioning their category membership just once, the first time they appear. Much use is made in the illustrations of a very few forms that are used many times, each in whatever fresh context or combination is required for illustration. Examples are abundant and are always accompanied by translations. As one moves forward through the syntactic section, they grow progressively longer and more challenging without ever completely abandoning the small, core set of lexical items he chose for this purpose. The text also includes implicit justification for some of the analytical steps taken. For example, Bloomfield refrained from referring to what later scholars call the focus-marking particles of Tagalog as case markers. The examples he cited 'make it possible to speak, in a very wide sense, of three "cases" in which an object expression may stand... but it is to be observed that these "cases" are not confined to any class of words, but appear in any word or phrase when it stands in the object construction' (1917: 161). In a note to this passage, he further observed that these Tagalog constructions are 'so different from what is ordinarily understood by cases that the above terminology has been avoided...' To Bloomfield at least, these language-specific categories are not simply new labels for old distinctions that could just as well have been called case markers, nouns, and verbs or the like. Instead, they reflect the different structural map of Tagalog, which is unlike European languages in many important respects. It was this aspect of Bloomfield's freedom from preconceptions that seems to have been most irritating to scholars already accustomed to working with a language in terms of traditional (that is, European) grammatical and notional categories. Blake (1919), in his review of the *Tagalog Texts*, complained of such terms as 'static word' and 'transient word' (instead of 'noun' and 'verb'); in his analysis of Ilocano (1942) Bloomfield replaced these by 'object expression' and 'open expression' but not by noun and verb.

Ives Goddard, himself an Algonquianist, has provided a careful analysis of Bloomfield's descriptive and comparative work on these languages (Goddard 1987). He deals at length with Bloomfield's resolution of a fundamental dilemma of structural linguistics: how to reconcile accurate description, necessarily based on the details of language use by individual speakers, with the notion of language as a structural system shared by a speech community. Individuals differ in their usage, not only as individuals, but from situation to situation, and so on. A collection of accurately transcribed texts representing the usage of several speakers shows variation that often seems chaotic, and is at the very least a complex descriptive problem. However, as Goddard points out (1987: 200):

> It is hard to avoid observing that Bloomfield's achievement of the goal of describing the community norm of Menominee sits uncomfortably with his exhortation that in describing the language of a community a 'linguistic observer must record every form he can find and ... must not select or distort the facts according to his views of what the speakers ought to be saying' not to mention his general condemnatory remarks about normative grammars and about the obliteration of 'linguistically valuable forms' by the over-edition of ancient texts (Bloomfield 1933: 7, 37–38, 295, 497).

Goddard is to be commended for raising this most unpopular issue. It is nearly always resolved by linguists and indeed by other social scientists just as Bloomfield did, but often apparently without reflection, and still more often without a legacy of accurately recorded raw data so that emendations can be undone. Goddard shows how Bloomfield selected and when necessary edited his Algonquian data to compose a community norm of usage, both in phonology and in morphology (Goddard 1987: 200):

> He provided an explicit account only of the pronunciations, forms, and usages that he had determined constituted the norm, an entity that was in the final analysis an abstraction based on evaluation and analysis of the raw materials collected. His editing of the texts shows that he regarded them as providing examples of Menominee that were consistent with the norm and not as attestations of varieties of actual speech.

It is worth repeating that Bloomfield should bear no more than his share of the responsibility for such emendations. Goddard notes that Bloomfield rightly decided to publish his Menominee texts before the analysis, and that unfortunately very few linguists collect or publish texts at all: 'Each age will write its own grammars, but the texts are for all time' (Goddard 1987: 201).

Bloomfield's long-standing interest in mathematics led to a manuscript of some 300 pages on mathematics as *The Language of Science* (ca.1937), in which he 'accepted the discourse of mathematicians as a corpus, and treated that corpus by much the same sort of analysis to which he subjected Tagalog or Menomini texts, or any other body of data' (in Hockett 1970: 333). Only a few pages survive but they are of the highest importance in understanding Bloomfield's thought and its place in the development of linguistics.

The work must be placed at the origin of several traditions within the field: it was apparently the most searching example of an analysis of a technical sublanguage yet produced, and it should also count as a lost forerunner of the generative approach to syntax. It was strikingly free of notational and terminological apparatus except for the mathematical terms themselves, which are after all the object language of the work. Even the few surviving scraps of manuscript make it clear that Bloomfield's work had nothing in common with the caricature presented later as taxonomic linguistics. On page 103 of the manuscript, for instance, Bloomfield is engaged in distinguishing number sequences by means of an 'immediate successor' relation. Having noted that if *two* is the immediate successor of *one*, it may still be the case that *one* is the successor of *two* or of some later number in the sequence:

> Systems of arithmetic where this is the case are *modular* systems. The number system of English and of ordinary arithmetic, by contrast, is an infinite system. For it, we must rule out the recurrence of *one* in the chain of the operator *Immediate successor of*. This demands a recursive definition of the serial operator *Sequent of*, as above given ... (Bloomfield in Hockett 1970: 335).

A later, unnumbered page deals with various ways of naming irrational numbers. In the third of these ways,

> a formula defines an infinite class of rational numbers and orders this class so as to make it approach a limit; this limit then satisfies the definition of a real number, and may be irrational.

On page 213 he describes a formula for naming circulating (i.e., repeating) decimal numbers and mentions some linguistic consequences:

> We now change to a level of discourse where the *R*'s are thing-nouns. They are members of a class O, which is defined as follows. (1) Say *decimal point*; (2) recite any sequence of digits or none; (3) name a second sequence of digits, not all zeros, as a circulating sequence; if you want to avoid duplicates, this sequence must not be the same as the end of the sequence (2). Then any speech-form of the shape (1)–(2)–(3) or of the shape (1)–(3) is a member of the class O.
>
> Given the class O, together with a formula for well-ordering it, such as that in the above array, we can define, *as functions of O*, infinite classes of speech forms of the type *N*.

Notice that Bloomfield is here giving explicit grammatical descriptions that generate infinite classes of verbal expressions and that the semantics of these expressions is also explicit, namely, certain parts of arithmetic. It is easy to imagine how much more pretentious this treatment of mathematical English could be made through the use of a quasimathematical notation, but the use of slightly extended English as a medium of expression for the rules should not conceal their explicitness and generative power. For Bloomfield as for other structuralists, there was no necessary limitation of the scope of a description to the content of the corpus it was based on. Moreover, these fragments are certainly evidence of a specific concern with the creative or generative aspect of language use, a concern already present in his doctoral dissertation some 30 years earlier on the analogic productivity of vowel alternations in Germanic vocabulary sets.

4. Distributionalism

After 1945 a new generation of linguists emerged as disciplinary leaders. Bernard Bloch, Zellig Harris, Archibald Hill, Charles Hockett, Martin Joos, Henry Lee Smith, George Trager, and Rulon Wells were prominent figures in this group.

They disagreed on many theoretical issues but shared a commitment to some form of distributionalism, holding that analytic criteria based on the distribution of linguistic forms were preferable in theory to tests of semantic sameness or difference. The distribution of a linguistic element is the sum of the environments in which the element occurs.

The distributionalist program arose indirectly out of the view of meaning as a domain of continuously variable and possibly unknowable details without verifiable internal organization that was held in common by Bloomfield and the distributionalists. Forms, unlike meanings, were observable and easily distinguishable, allowing precise distributional statements *whose outcomes were thought to be equivalent to those that would otherwise be reached through appeal to semantic tests.* Unlike Bloomfield, who made and used judgments of semantic sameness and difference as best he could, the distributionalists took this skepticism about meaning-based criteria as a warrant for relying instead on the distributions of forms alone in making analytical decisions. They were more than willing to leave analytical criteria based on sameness or difference of meaning for the indefinite future when other branches of science had supplied the knowledge necessary to illuminate every aspect of the similarities and differences of, for example, dogs and cats.

Forms were subject to certain candidacy criteria as part of the determination of their contrastive status. These were usually standards of similarity in substance, for example, phonetic similarity among allophones of a phoneme and phonemic similarity among alternants of a morpheme (in early distributionalist theories). Complementary distribution enjoyed a special status in this approach. This is the relation of two elements such that where one occurs the other does not. Elements in complementary distribution *that also meet the criterion of similarity* are noncontrastive with each other and may be assigned to the same structural element as alternants. In other distributional relationships, elements share some or all of their environments, and may be contrastive or not.

The crucial problem of strictly distributional analysis was to decide whether forms occurring in the same environments were different (contrastive) or equivalent (noncontrastive). For example, were two words contrastive (different forms with different meanings) or synonymous (different forms with the same meaning)? For Bloomfield, the problem did not arise in this way: he used meaning as a criterion of analysis. Distribution for him was contingent on identities and differences established through assessing both formal and semantic sameness and difference. The 'Bloomfieldian' distributionalists' solution to this problem, however, was in effect and sometimes explicitly to deny that 'true' synonymy was possible. The argument was roughly as follows:

(a) Forms identical in meaning would be mutually substitutable in all environments, and thus would not differ in distribution.
(b) Forms differing in meaning are not mutually substitutable in all environments, and therefore differ in distribution.
(c) Observation shows that different forms always differ somewhat in distribution, and therefore must differ somewhat in meaning.
(d) A difference in form implies a difference in distribution and in turn a difference in meaning. There are thus no true synonyms.

The first assumption is not necessarily true: factors other than meaning that influence the co-occurrence of forms are easily brought to mind. Phonological shape, length or metrical factors, situational variables, and historical accidents leading to the fossilization of a particular expression sometimes produce minor differences of distribution that, under the distributionalist theory, must be regarded as implying minor, possibly undefinable differences of meaning.

The positions taken by the distributionalists on the proper role of meaning in linguistics nevertheless covered a wide range. Joos was actively interested in lexicology and semantic structure (1958). Bloch and many others regarded meaning as a practical shortcut to the results best obtained through more laborious but precise distributional analysis. Harris expressed a similar view, but devoted most of his *Methods* (1951a) to establishing a body of distributionally based analytical procedures. Trager was fully committed to excluding meaning from linguistics altogether.

Bloch (1948) remains the clearest statement of a distributional approach to phonology; his note on contrast (1953) was an attempt to redefine the notion distributionally. Much of Harris (1951a) was devoted to establishing methods of distributional analysis for all levels of linguistic description.

4.1 Levels of Structure, Levels of Analysis, and Levels of Description

Distributionalists typically presented language structure in levels, including phonology, morphology, and syntax. It was possible to describe an utterance in terms of the patterning of elements of sound, displaying its structure as a composite of their paradigmatic and syntagmatic relations alone. Alternatively, one could show the same utterance in terms of its morphological elements, and their paradigmatic and syntagmatic relations. The elements belong to different sets and also to different levels; their relations of alternation and substitution are also characteristic of different levels. An utterance is a string of syllables; it is also a string of morphemes. But a syllable is not a morpheme (except by coincidence). Each layer of patterning conveys a part of the overall structure of the utterance and the language.

Wells (1963) regarded a full exploitation of the levels idea as one of the missed opportunities of descriptive linguistics. In early structuralism, there is no clear separation of structural elements into levels such as phonology, morphology, and syntax, such that an element of one type occurring on a higher level was represented by one or more elements of another type on a lower level in the way that a phoneme is represented by its allophones. Morphological and morphophonemic processes were mixed freely with word order and selection in the composition of meaningful grammatical forms. There was some variation in the handling of the levels idea among the distributionalists, but in general they treated it as proper to both analysis and description, whereas others, such as Kenneth Pike, regarded distinguishing levels of description as more important than separation of levels in the course of analysis. In analysis, he argued, structural cues of many kinds must be taken into account all at once, to be sorted out in the presentation of the structure of the language.

4.2 Zellig Harris

Harris's work deserves special attention for several reasons: it is an unusually coherent and formal statement of distributionalist structural linguistics, and it was the variety best known by Noam Chomsky, Harris's student at the University of Pennsylvania and the proofreader of Harris's *Methods* (1951a). The meaningful grammatical categories and construction types of Bloomfield and Sapir are largely replaced in Harris's work by morphemes and morpheme sequences:

> . . . it suffices to define 'meaning' (more exactly 'difference in meaning') in such a way that utterances which differ in morphemic constituency will be considered as differing in meaning . . . Then the meaning of each morpheme in the utterance will be defined in such a way that the sum of the meanings of the constituent morphemes is the meaning of the utterance (Harris 1951a: 190).

Harris also allows for the assignment of meaning to constructions (1951a: 347–48) in instances when all occurrences of a particular construction share some feature of meaning, which is then 'taken out' and not assigned to individual morphemes; he gives a reference to Bloomfield's tagmemes. There is little or no use of this option in Harris's own work, however.

Harris's overall strategy was to reduce grammar (cf. Wells 1963), which he considered either a body of prohibitions or the equivalent body of positive assertions. If by adroitly combining distributionally based classes, the necessary prohibitions could be reduced or made to disappear, then grammar would be reduced by that much, and linguistic elements could be combined more freely. The unattainable end point of this strategy would be a description whose elements were freely combinable without the need for grammatical rules to restrict them. This attitude is close to the surface in his treatment of Sapir's categories, when he suggests that the hierarchical system of named types of word forms could be flattened:

> In general, the technique of classification and naming can be replaced by the technique of stating relations. Thus, Newman calls a base plus non-final suffix a theme, and obtains classes of themes according to the non-final suffix which went into making them. We could just as well speak in terms of base- and base-plus-suffix, and avoid the term 'theme.' We can similarly side-step the stem-classes of bases and themes. (Harris 1944: 203)

5. Summary

Sapir and Bloomfield were much alike in their practice of descriptive linguistics, but less so in their programmatic and theoretical writings. Their styles of presentation of formal patterns differ mostly in rhetoric: form-oriented, distributionalist rhetoric in Bloomfield and psychologistic, pattern-oriented rhetoric in Sapir. But these styles clothe descriptions that are very similar in organization. Between them and the later 'Bloomfieldians,' however, there were quite significant differences. These distributionalists developed a relational mode of descriptive statement, relying on tests of noncontrastive distribution rather than sameness of meaning as a basis for grouping forms together into equivalence classes. They advocated a system of levels of analysis and description to organize distributional relationships among linguistic elements according to the level of each element. The patterning of phonological elements was not to be mixed with the patterning of morphological elements, nor either of these with syntax. An occurrence of the morpheme {pin} was not at all the same thing as an occurrence of the phoneme sequence /pin/, even though /pin/ was the phonemic shape of {pin}. The two are elements of different structural levels.

The 'Sapirians,' students and grandstudents of Sapir, diverged less from the linguistic theory and practice of their mentor, but their influence continued to diminish as linguistics lost some of its standing within anthropology after the passing of Sapir and Boas. By the late 1940s, when linguistics departments were first appearing in major American universities, linguistic anthropologists trained in the Boas–Sapir tradition found themselves scattered among anthropology departments, and deprived of their two most prestigious leaders. Major commitments of time and resources to linguistic research within anthropology eroded, and disciplinary leadership of linguistics passed definitively to the Bloomfieldians. Bloomfield's own work had been stopped by illness in 1946; in any case his personal contribution was not as an academic political leader but as an intellectual model. This result for the Boas–Sapir–Bloomfield style of linguistic anthropological description is ironic, since all three had signed the call for a Linguistic Society in 1925 in part to ensure closer collegiality among scientists of language, who were then scattered among departments of modern and Classical languages and literatures. A decade or so after the death of Bloomfield, the influence of Chomsky's transformational approach to syntax and its theoretical matrix began to gain ascendancy within the discipline. Though in many particulars Chomsky's linguistics is a continuation of structuralist thinking, it is also in significant ways a reaction against Harris's methods, and in its wider theoretical context it represents a return of pre-Bloomfieldian views, such as mentalism, psychologism, and nativism.

Another link between descriptive structuralism and its successors is formed by the continued teaching of a descriptive approach to linguistics through the use of a number of monographs and textbooks dating from the 1920s to the 1950s until the transformational approach acquired its own in the 1960s. Carroll's collection of Whorf's papers (1956) and Sapir's beautifully written *Language* (1921) attracted many readers to linguistics courses wherever these could be found; there they were exposed to readings drawn from Bloomfield (1933), Francis (1958), Gleason (1955), Harris (1951), Hill (1958), Hockett (1958), Joos (1957), Nida (1946, 1949), Pike (1947), and Trager & Smith (1951). It is noteworthy how strongly the missionary linguistic movement is represented in the list (by Gleason, Nida, and Pike).

It was not only newcomers during the 1950s and 1960s who profited from what these books taught, but also their teachers, whether converts to a transformational approach or not, who had learned linguistics from them. These works exposed their readers to an immense fund of well-organized examples drawn from decades of first-hand experience often gained in fieldwork, an orderly, practical approach to problem solving, and a love of language study shared by all their authors. The debt Transformational Grammar and linguistics itself owes to these now maligned books and their authors is difficult to measure, but is surely far greater than has ever been acknowledged.

Bibliography

Blake F 1919 Review of Bloomfield 1917. *American Journal of Philology* **40**: 86–95

Bloch B 1948 A set of postulates for phonemic analysis. *Language* **24**: 3–46

Bloch B 1953 Contrast. *Language* **29**: 59–61

Bloomfield L 1943 Obituary of Franz Boas. *Language* **19**: 198

Bloomfield L 1912a Etymologisches. [Paul und Braunes] *Beiträge zur Geschichte der deutschen Sprache und Literatur* **37**: 245–61

Bloomfield L 1912b Review of Wilhelm Braune, *Althochdeutsche Grammatik*. 3. u. 4. Aufl. (Halle a/S, 1911). *Journal of English and Germanic Philology* **11**: 269–74

Bloomfield L 1913 Review of Wilhelm Wundt. *Elemente der Völkerpsychologie: Grundlinien einer psychologischen Entwicklungsgeschichte der Menschheit*, vol. 2. Aufl. (Leipzig 1913). *American Journal of Psychology* **24**: 449–53

Bloomfield L 1914 *Introduction to the Study of Language*. Holt, New York (Repr., with an introd. by Kess J F 1983 Benjamins, Amsterdam)

Bloomfield L 1917 *Tagalog Texts with Grammatical Analysis*. University of Illinois Studies in Language and Literature, vol. 3, no. 204, University of Illinois, Chicago, IL

Bloomfield L 1927 On recent work in general linguistics. *Modern Philology* **25**: 211–30

Bloomfield L 1933 *Language*. Holt, New York

Bloomfield L 1937 The language of science. Unpublished manuscript. In: Hockett C F (ed.) 1970

Bloomfield L 1942 Outline of Ilocano syntax. *Language* **18**: 193–200

Bloomfield L 1943 Obituary of Franz Boas. *Language* **19**: 198

Boas F (ed.) 1911, 1922, 1934 *Handbook of American Indian Languages, Parts 1, 2, 3*. Smithsonian Institution, Bureau of American Ethnology, Washington, D.C.

Boas F 1889 On alternating sounds. *American Anthropologist* **2**: 47–53

Francis W N 1958 *The Structure of American English*. Ronald Press, New York

Gleason H A 1955 *An Introduction to Descriptive Linguistics*. Holt, Rinehart & Winston, New York (2nd edn., 1961)

Goddard I 1987 Leonard Bloomfield's descriptive and comparative studies of Algonquian. In: Hall R A (ed.) 1987

Goodenough W 1956 Componential analysis and the study of meaning. *Language* **32**: 195–216

Goodenough W (ed.) 1964 *Explorations in Cultural Anthropology*. McGraw-Hill, New York

Hall R A (ed.) 1987 *Leonard Bloomfield: Essays on His Life and Work*. Benjamins, Amsterdam

Harris Z 1944 Yokuts structure and Newman's grammar. *International Journal of American Linguistics* **10**: 196–211

Harris Z 1951a *Methods in Structural Linguistics*. University of Chicago Press, Chicago, Illinois

Harris Z 1951b Review of Mandelbaum 1949. *Language* **27**: 288–333 (Repr. in: Koerner E F K (ed.) 1984 *Edward Sapir: Appraisals of his Life and Work*. Benjamins, Amsterdam)

Hill A A 1958 *An Introduction to Linguistic Structures: From Sound to Sentence in English*. Harcourt, Brace & Co., New York

Hockett C F 1958 *A Course in Modern Linguistics*. Macmillan, New York

Hockett C F (ed.) 1970 *A Leonard Bloomfield Anthology*. Indiana University Press, Bloomington, Indiana

Hoijer H (ed.) 1954 *Language in Culture: Conference on the Interrelations of Language and Other Aspects of Culture*. University of Chicago Press, Chicago, Illinois

Hymes D (ed.) 1974 *Studies in the History of Linguistics: Traditions and Paradigms*. University of Indiana Press, Bloomington, Indiana

Hymes D, Fought J 1981 *American Structuralism*. Mouton, The Hague
Joos M 1957 *Readings in Linguistics*. American Council of Learned Societies, Washington, D.C.
Joos M 1958 Semology: A linguistic theory of meaning. *Studies in Linguistics* **13**: 53–70
Kuhn T 1962 *The Structure of Scientific Revolutions*. University of Chicago Press, Chicago, Illinois
Lounsbury F 1956 A semantic analysis of Pawnee kinship usage. *Language* **32**: 158–94
Lounsbury F 1964 A formal account of the Crow- and Omaha-type kinship terminologies. In: Goodenough W (ed.) 1964
Mandelbaum D G 1949 *Selected Writings of Edward Sapir in Language, Culture, and Personality*. University of California Press, Berkeley, California
Moulton W G 1970 Leonard Bloomfield as Germanist. In: Hockett C F (ed.) 1970
Nida E 1946 *Morphology*. University of Michigan Press, Ann Arbor, Michigan (2nd edn., 1949)
Pike K L 1947 *Phonemics: A Technique for Reducing Languages to Writing*. University of Michigan Press, Ann Arbor, Michigan
Sapir E 1921 *Language*. Harcourt, Brace & Co., New York
Sapir E 1922 Takelma. In: Boas F (ed.) 1922
Stocking G W, Jr. 1968 *Race, Culture, and Evolution: Essays in the History of Anthropology*. Free Press, New York
Stocking G W, Jr. 1974 The Boas plan for the study of American Indian languages. In: Hymes D (ed.) 1974
Trager G L, Smith H L 1951 *An Outline of English Structure*. Studies in Linguistics, Occasional Papers 3. Oklahoma Press, Normal, Oklahoma
Wells R 1963 Some neglected opportunities in descriptive linguistics. *Anthropological Linguistics* **5**: 38–49
Wells R 1974 Phonemics in the nineteenth century, 1876–1900. In: Hymes D (ed.) 1974

Post-Bloomfieldian Phonology

Erik C. Fudge

Post-Bloomfieldian phonology, also known as American structuralist phonology or Bloomfieldian phonology, is the approach to phonology which was most influential in the USA between about 1940 and 1960. It can best be characterized by two axioms: (a) linguistic description must proceed without reference to putative workings of the speaker's 'mind' (a view often referred to as 'antimentalism'); and (b) phonological analysis can only take place on the basis of phonetic properties, without reference to more abstract linguistic properties such as the meanings or internal structure of words ('no mixing of levels').

In the 1960s, it came under attack from generative phonologists, who pointed out the problems that arose in phonology from the rigorous application of certain positivist principles.

1. Leonard Bloomfield and Phonology

As its name implies, this approach owes much to the influence of Leonard Bloomfield, particularly to his attempts to apply positivist principles in linguistics. The culmination of his work was his book *Language* (1933). Followers of a great thinker often adopt a more extreme position than the thinker would himself have espoused; in some respects, post-Bloomfieldian phonology is no exception to this principle (see especially Sect. 3).

1.1 Phonemes

For Bloomfield, the only important features of sound are those which permit a speaker of a language to say whether two utterances in that language are 'the same' or 'different.' Other properties of the utterances are predictable (or 'allophonic'), and are therefore treated as having no systematic importance.

In most instances, sound differences correlate with meaning differences: in fact, a sound difference can be distinctive in a language only if it signals a change of meaning in a fairly wide range of contexts. Bloomfield was well aware of this, but took the view that an answer to the question 'Are the meanings of these utterances the same?' did not depend on a prior answer to the question 'What are the meanings of these utterances?' He held that, in the light of the then prevailing state of knowledge, this latter question would take the linguist beyond the area where solid answers could be obtained, and that, in fact, even if such answers were obtained, they could not be used as explanations for phonological facts.

1.2 Phonemic Systems

Although for Bloomfield phonemes consisted of just those features of sound which were distinctive, he did not follow Prague School phonologists (see *Prague School Phonology*) in using these features as the basis for structuring the phonemic system of a language. More important for him were the combinations into which a given phoneme of a language might enter, and in particular the place which it could occupy within a syllable. Thus, English /ŋ/ and /ʒ/ form a class because they never occur word-initially; /w/, /l/, /r/, and perhaps /j/ also form a class of consonants since they, and only they, can occur following a stop at the beginning of a syllable, for example, *twist*, *clap*, *bread*, *pure* /pjuə/.

1.3 Alternations

Another possible basis for establishing the sound system of a language was the way in which certain sounds alternate with one another in the different phonetic shapes of the same morpheme. Thus the English regular plural has three forms /s/, /z/, and /iz/; which one occurs in any given case is determined by the final sound of the root to which it is attached: *cats* has voiceless /s/ because the /t/ of *cat* is voiceless, *dogs* has /z/ because the /g/ is voiced, and *horses* has /iz/ because the final sound of *horse* is a sibilant.

It is important to notice that English /s/ and /z/ are not allophones of the same phoneme. They contrast initially (*sue* versus *zoo*), medially (*muscle* versus *muzzle*), and finally (*rice* versus *rise*), and, therefore, by the requirements of phoneme theory, they must be distinct phonemes. Since they enter into the alternation described above, /s/ and /z/ form a class of phonemes within the system.

The above is a case where the phonetic properties of the final sound of the root determine which form of the plural occurs; Bloomfield therefore refers to it as a 'phonetic alternation.' He also recognizes other types of alternation, and introduces appropriate terminology.

2. Bloomfield's Immediate Successors

2.1 Morris Swadesh

Although Edward Sapir had adopted a view of the phoneme which was very different from that of Bloomfield, a number of his pupils contributed to the development of Bloomfield's ideas. Notable among these was Morris Swadesh, whose important paper 'The Phonemic Principle' (1934) marked a significant step forward in the process of refining the inductive procedure by which phonemes could be discovered: note particularly the five criteria, together with the test of substitution, to be found in the section entitled 'Method.' The place which Swadesh accords to phonetic properties in the classification of phonemes is much more important than Bloomfield appeared to allow.

In spite of the 'Bloomfieldian' approach of many aspects of this paper, it also bears the marks of 'Sapirean' phonology. For example, Swadesh takes the view that the phonemes of a language 'are, in a sense, percepts to the native speakers of the given language,' drawing a clear parallel between the concepts with which linguists work and the intuitions of native speakers. He also draws parallels between the inductive processes applied by the linguist in studying a language and the 'unconscious processes' of a native acquiring that language.

2.2 Yuen Ren Chao

Another important paper (also 1934) dealing with the definition of the phoneme is 'The Nonuniqueness of Phonemic Solutions of Phonetic Systems' by Yuen Ren Chao. In it, he questions the assumption which he detects in the discussions of the phoneme of that period, namely that there is only one correct system of phonemes to which the sounds of a language can be reduced. The bulk of the paper is devoted to the citing of facts from a wide range of languages; these indicate that situations arise in which the decisions are not made for the phonologist by the agreed principles for establishing phonemes, but rather remain for the phonologist to make independently.

Chao also recognizes that the actual principles for establishing phonemes, and hence the system of phonemes established, may in fact differ depending on the objectives adopted by the linguist. Seven possible objectives are listed; the first three of these are uncontroversial, and would be accepted by all phonologists. The remainder, however, are less straightforward.

'Regard for the feeling of native speakers' is an objective which Chao favors, and specifies as being particularly important to Sapir; it was rejected by most of the post-Bloomfieldians on antimentalist grounds, but later found great favor with generative grammarians. 'Regard for etymology' he mentions as a possibility, but one which should be excluded from consideration in a true descriptive grammar.

The last two objectives, on the other hand, were to turn out to be central to the interests of the post-Bloomfieldians. 'Mutual exclusiveness between phonemes' adumbrated one of the key issues taken up later under the guise of 'phonemic overlapping' (see the account of Bloch's work in Sect. 3.1 below). Finally, 'symbolic reversibility' raised the question of whether the property later called 'biuniqueness' ought to hold of a phonemic transcription (see Sects. 3.1 and 3.3 below).

Another interesting observation made by Chao is that 'a phonemic transcription is pronounceable without reference to grammatical or lexical consideration'—a very early example of explicit prohibition of the 'mixing of levels' in phonological analysis.

2.3 W. Freeman Twaddell

One important treatment of the phoneme which appeared at this time was Twaddell's 1935 monograph *On Defining the Phoneme*. He acknowledges in a footnote the discussions that he had had with Bloomfield on the matter.

Twaddell recognized that many linguists (including Sapir) saw the phoneme as a 'mental image' of a sound. Every sound uttered was the result of the speaker's attempt to articulate the appropriate ideal sound-image, and every sound perceived was the result of the hearer matching the actually uttered sound wave with the ideal sound-image which the hearer judged to be nearest to it.

However, Twaddell believed that such considerations could not be the basis for a definition of the phoneme; the objections to such 'mentalistic' procedure raised by Bloomfield were, in his view, unanswerable. Not only did the scientist 'have no right to guess about the workings of an invisible "mind,"' but also, even if it were possible, one would 'secure no advantage from such guesses.' He also pointed out that, if a definition of the phoneme could be based on observable evidence, reference to mental entities would no longer be necessary.

Having disposed of a 'mentalistic' definition of the phoneme, and having attempted a refutation of the evidence adduced by Sapir in support of such a definition, Twaddell turns his critical attention to physical views of the phoneme, notably two basic types of definition: (a) that a phoneme corresponds to the *sum* of all its allophones (as put forward by Daniel Jones), and (b) that a phoneme consists of the *common core* of all its allophones (as put forward by Bloomfield).

The main criticism which Twaddell makes of Bloomfield's definition is that experimental phonetics had shown that, for a particular phoneme, no constant, characteristic features could be found in all and only the sound waves corresponding to it. Even if one allows that the sound spectrograph, which was not developed until about 10 years later, made it much easier (as Bloomfield had in fact anticipated) to point to a common core of properties in careful speech, the machine showed clearly that this was not the case in more informal styles: Twaddell's criticisms remain, in principle, valid in the 1990s.

In the light of what Twaddell takes to be the failure of both the mentalistic and the physical attempts to define the phoneme, he then turns to a different approach: the view of the phoneme as a 'fiction,' corresponding to no physical or mental reality. The basis of his definition is the study of the phonetic relations holding between pairs of sounds in different contexts. In this, he is in fact returning to Saussure's dictum '*Dans la langue il n'y a que des différences sans termes positifs*.' It is noteworthy that in his discussion of the phoneme he comes close to the polysystemic approach of J. R. Firth (see *Firth and the London School of Linguistics*).

It has to be said that, although Twaddell treats his phoneme-like entities as 'abstractional fictions' quite distinct from physical or mental realities, he clearly regards this as an interim solution—he states that if further research were to show that the phoneme actually had certain physical or psychological properties, this would be a bonus for holders of his view.

3. American Structuralist Phonemics in the 1940s and 1950s

Between 1936 and 1940, no contributions were made to phonemic analysis which were comparable in importance with the works referred to in Sect. 2 above. The work of Prague phonologists on morphophonemics sparked off a response from Bloomfield as a contribution to the memorial volume for Trubetzkoy which appeared in 1939: in the same year, Swadesh & Voegelin produced a paper on a similar topic.

The arrival of morphophonemics side-by-side with phonemics soon made it necessary to establish the borderline between them, and to make explicit the intuition that nothing morphological could be allowed to influence phonemics. A series of papers tackling these problems appeared in the 1940s, beginning with Bloch (1941).

3.1 *The Work of Bernard Bloch*

Bloch's 1941 paper, 'Phonemic Overlapping,' addressed the question of whether a given sound is allowed to belong to two or more different phonemes in the same dialect—in other words, whether phonemes can be allowed to intersect. Two cases are distinguished: 'partial overlapping' and 'complete overlapping.'

In partial overlapping, a sound would be assigned to one phoneme if it occurred in one particular type of context, and to a different phoneme if it occurred in a different type of context. The alveolar tap sound [ɾ] may occur in American English between vowels, as in *butter* [bʌɾə]; in this case, it would be assigned to the phoneme /t/. It may also occur for some American speakers after /θ/ in syllable-initial position, as in *three* [θɾiː]; in this case, it would be assigned to the phoneme /r/.

Complete overlapping would allow instances of a sound to be assigned to more than one phoneme, even if each instance occurred in the same phonetic context. English [ə], for example, might be assigned to any one of the short vowel phonemes: in the weak form of *at* (as in *at 'home*), it might be an allophone of /æ/ (cf. *where 'at*); in the weak form of *them* (*'see them 'go*), it would be an allophone of /e/ (cf. *not 'them*); in the weak form of *could* (*'they could 'go*) it would be an allophone of /u/ (cf. *they 'could*).

In the complete overlapping situation, there is no problem in proceeding from the phonemic representation (the full vowel in these examples) to the phonetic ([ə] in each case)—rule (1) gives the correct result in all cases.

/Short vowel/ → [ə] when completely unstressed (1)

However, there are two problems in going in the opposite direction, that is, in determining the correct phonemic representation of occurrences of [ə]. First, there are a number of words in which the full vowel corresponding to the [ə] never shows up. Thus, the first vowel in *a'bout* and *con'fess* is always [ə], and it would be impossible to say which short vowel phoneme should be used to transcribe it (note that facts of spelling are not admissible as evidence).

Second, even where the [ə] does alternate with a full vowel, one would need to know that the form with [ə] and the form with the full vowel are forms of the same word. This is more than one can legitimately know on the basis of the phonetic properties of the utterance, which are claimed to be the only data relevant to phonemic analysis.

The post-Bloomfieldians took it as axiomatic that the analysis should be able to proceed in both directions with equal simplicity—a concept later referred to as 'biuniqueness'. Interestingly Bloch recognizes the kind of difficulty which could arise from a strict insistence on biuniqueness: symmetry of analysis (in itself a desirable thing) often has to be sacrificed in the interests of accounting for all the facts of pronunciation. Generative phonologists were later to reverse this order of priority.

In the late 1940s, under the influence of Zellig S. Harris (see Sect. 3.3 below), Bloch attempted to move away from the use of sameness/difference of meaning as a criterion in defining phonemic difference. His 1948 paper, 'A Set of Postulates for Phonemic Analysis,' attempted to base the definition of the phoneme on facts of 'distribution,' that is, the range of contexts in which various sounds occurred.

Ironically, difficulties of priority associated with biuniqueness arose again later in the work of Bloch: in 1946, he produced three papers on the structure of Japanese, using a transcription system based on the official Japanese romanization. It was only later that Bloch realized that this transcription was heavily influenced by morphophonemic considerations, and hence violated the principles for phonemic analysis which he had set down in 1941 and 1948. To deal with this situation, he produced a fourth paper on Japanese in 1950, embodying a phonemic transcription which was consistent with those principles.

In the final section of the 1950 paper, however, Bloch in effect has to admit that his earlier transcription was superior for many practical purposes. He allows that, once a strict phonemic transcription has been used to study the behavior of morphemes, new information discovered on this basis may be used to modify the transcription. Such a modified transcription, Bloch states, is usually far better adapted to the study of the morphology and syntax of the language, reveals more of the structure of the language when used to write connected texts, and is found easier to read by native speakers of the language.

Significantly, although these advantages were clearly apparent, they were not felt by post-Bloomfieldians to carry sufficient weight to justify the abandonment of the strict phonemic transcription. This illustrates the basic importance which they attached to the two theoretical principles with which this article began.

3.2 The Work of Charles F. Hockett

The first major contribution by Hockett was the 1942 article 'A System of Descriptive Phonology.' In a footnote, he claims that his paper is influenced mainly by the work of Bloomfield, though rather more by his methodological rigor than by the actual phonemic theories which he put forward. The work is stated as also deriving from Sapir and Trubetzkoy, and owing much to the advice of Bloch.

The appearance of this and a number of important papers by others at about the same time probably owed much to the contribution which linguists were called upon to make to the US war effort. Key military and intelligence personnel urgently needed to learn a range of foreign languages quickly, which in turn demanded the production of accurate and soundly based coursebooks in those languages. In producing these coursebooks, the linguists concerned needed to draw sound conclusions about the structure of the languages and how this structure should be described and represented. The process of reaching these conclusions was perceived as casting light on many theoretical issues.

The relationship between phonemes and the physical properties of sounds can be properly stated, according to Hockett, only if a distinction is drawn between two aspects of phonetics: (a) the study of purely physiological and/or acoustic properties of sounds; and (b) the study of how certain of these properties are distinctive in a particular language.

Aspect (a) is totally language-independent; Hockett refers to it as 'α-phonetics,' and to its basic elements as 'α-sounds'; such elements consist of nondistinctive properties as well as distinctive ones. The source of most of Hockett's material in this area is stated to be taken from the dissertation which was eventually published as Pike (1943).

Aspect (b) is referred to as 'β-phonetics,' and its basic elements as 'β-sounds'; such elements consist exclusively of properties which are distinctive in the language, that is, features. Material which is β-phonetic can be further analyzed into 'phones,' and the phones in turn classified into 'phonemes'; these two processes constitute 'phonemics.'

The overriding principles which for Hockett govern the way in which phonological analysis is to be carried out include the following (cf. (a) and (b) in the introductory paragraph above):

(a) there must be no mentalism;
(b) there must be no circularity: phonological analysis is assumed for grammatical analysis, and so must not assume any part of the latter.

One striking feature of Hockett's work is the influence of the Prague School—it is noteworthy that, while most of his associates use the term 'phonemics' in preference to the Prague term 'phonology,' he uses the latter, reserving 'phonemics' for particular aspects of the field. He also follows Prague (thus going beyond Bloomfield) in viewing phonemes as consisting of bundles of features, which constitute a further basis for establishing classes of phonemes, and hence make an important contribution to the structure of phonemic systems.

Some features are noted as extending over a sequence of segments: in the word *crypt*, voicelessness extends simultaneously over the /p/ and the /t/. This approach is developed in greater detail in the work of Harris (Sect. 3.3 below).

Later works by Hockett further develop the notion of features: 'Peiping phonology' appeared in 1947, explicitly superseding certain sections of his 1942 paper, and illustrating the theory from a detailed study of Chinese.

His most comprehensive phonological work is his 1955 *Manual of Phonology*. Many post-Bloomfieldians believed that any attempt to state a general typology of language systems could not avoid failure: this was widely seen as a corollary of the dictum that 'languages can differ from each other without limit and in unpredictable ways.' Hockett, however, is unwilling to draw this conclusion from the dictum; he explicitly claims that the development of a phonological typology is one of his primary aims in writing the *Manual*, and refers with approval to Trubetzkoy (1939; see *Prague School Phonology*) as a worthwhile attempt to produce such a typology.

The other special feature of the *Manual* is the thoroughgoing application of the 'immediate constituent' principle, originally proposed as a tool for syntactic analysis. Hockett mentions a hint of hierarchical structure in the work of Bloomfield, and points to Hjelmslev's insistence (see *The Glossematic School of Linguistics*) on a basic similarity between the principles of analysis operating in the 'expression' plane (approximately phonetics and phonology) and those operating in the 'content' plane (approximately syntax and semantics).

As a striking example of how the principles of immediate constituent analysis might be extended from syntax into the domain of phonology, Hockett cites Pike & Pike (1947). Hockett's application and extension of Pike & Pike's methods lead him to elaborate the notion of 'syllable' as fundamental to phonology, and as the basis of a phonological typology of languages.

3.3 The Work of Zellig S. Harris

As stated above (Sect. 3.1), one of the distinctive contributions to post-Bloomfieldian linguistics of Zellig S. Harris was the use of 'distribution' (the range of contexts in which an item occurred) as the basis of establishing linguistic units on all levels (morphemic, syntactic, and semantic, as well as phonological). The method is developed to its full extent in Harris (1951).

In the development of post-Bloomfieldian phonology, Harris's most original insight is perhaps the concept of 'simultaneous components,' as introduced in his 1944 paper 'Simultaneous Components in Phonology.' He starts from the generally recognized principle that stress and intonation features are regarded as simultaneous with the sequences of phonemes over which they operate, and in particular as simultaneous with (but not part of) the vowels which manifest them most clearly.

For example, consider *yes* uttered as a statement, with a falling pitch, and *yes* uttered as a question, with a rising pitch. It might be held to be feasible to analyze the difference between them as residing in the vowels of the two utterances, recognizing falling [e] and rising [e] as two distinct phonemes, say /è/ and /é/. Normally, however, rather than operating in this way, phonologists would 'factor out' the pitch patterns as being simultaneous with the whole word *yes*, and recognizing only one /e/ phoneme, which recurs in both utterances.

This type of analysis is then extended to operate at all levels, so that, for instance, phonemes may be split into smaller, but simultaneous, pieces, rather as Prague phonologists came to view phonemes as analyzable into distinctive features (see *Prague School Phonology*). Such an analysis enables the system of phonemes to be structured on grounds of recurring phonetic properties (see Sect. 3.2 above).

This approach can also be used, and in fact had been used implicitly in a number of earlier analyses, to justify putting a single segment of sound into correspondence with a sequence of phonemes. Thus, in many varieties of American English, *painting* may be pronounced [peiɾ̃ɪŋ], with a single sound segment [ɾ̃] (nasalized alveolar tap) between the vowels; in order for this segment to be assigned a phonemic analysis in terms of the sequence /nt/, [ɾ̃] will require to be split into two simultaneous components, [nasality] and [alveolar tap], the first being taken as an allophone of /n/ and the second as an allophone of /t/.

Perhaps more original still is Harris's extension of the simultaneity concept to longer stretches of phonemes. Components two or three phonemes in length were seen as usable to indicate limitations on the distribution of any phoneme which contains them.

Thus, within English morphemes, the sequence /sp/ occurs as in *aspen*, and /zb/ occurs as in *Osborne* (where the *s* is in fact pronounced /z/); /sb/ and /zp/, on the other hand, do not occur. The need to state these limitations separately is avoided if one proceeds as follows. In the single phonemes /s/ and /p/, most phonologists would wish to treat voicelessness (represented in (2) by 'o') as a simultaneous component with alveolar friction ('Z') and labial closure ('B') respectively:

$$/z/=\mathrm{Z} \qquad /s/=\overset{\ulcorner\text{o}\urcorner}{\mathrm{Z}} \qquad /b/=\mathrm{B} \qquad /p/=\overset{\ulcorner\text{o}\urcorner}{\mathrm{B}} \tag{2}$$

In the sequence /sp/, Harris's innovation was to treat voicelessness as a long component two phonemes in length, as in (3). This would put a bar on the occurrence of the impossible combinations shown in (4):

$$/zb/ = Z \quad B \qquad /sp/ = \overset{\circ}{\overline{Z \quad B}} \tag{3}$$

$$*/sb/ = \overset{\circ}{\overline{Z \quad}}\, B \qquad */zp/ = Z\, \overset{\circ}{\overline{\quad B}} \tag{4}$$

Long components show considerable similarity to the 'prosodies' which Firth (see *Firth and the London School of Linguistics*) was developing at about the same time.

One respect in which Harris's work remained consistent with earlier post-Bloomfieldian phonology was that the requirement of biuniqueness which had to hold between a phonemic representation and a phonetic one was still maintained between representations using long components.

4. Junctures

The requirement of 'no mixing of levels' gave rise to particular difficulties for phonemic analysis, one of which was the phenomenon which came to be known as 'open juncture,' or sometimes as simply 'juncture.'

Trager & Bloch (1941) noted that, at the beginnings and ends of utterances, certain special features of pronunciation may occur. In some varieties of English, for example, vowels tend to have a longer duration than usual in utterance-final position: the vowel of *sly* is longer than the first vowel of *minus*. In these positions, such special sounds may be taken simply as allophones conditioned by the presence of a preceding or following pause.

However, these special sounds were also found to occur in the middle of utterances, even where pauses could not occur. In the varieties mentioned, the (non-utterance-final) vowel of *slyness* is as long as the vowel of *sly*, and thus would contrast with the (shorter) vowel of *minus*.

There are two alternative ways of proceeding. First, one might recognize twice as many vowel phonemes: in the above example, one would no longer speak of one phoneme /ai/, but distinguish a long /aːi/ in *sly* and *slyness* from the short /ai/ in *minus*. Second, one might postulate a new kind of phonemic element, 'open juncture,' which behaved rather like a pause: *slyness* would be /slai-nəs/, with open juncture represented by a hyphen. However, the /ai/ and /n/ of *minus* would be taken to be normally adjacent phonemes in a relationship of 'close juncture': *minus* would thus have the representation /mainəs/. Vowel lengthening would then take place before open juncture, but not before close juncture.

Generally speaking, no phonologist has ever wanted to adopt the first of these choices. However, the second choice was attended by two serious problems. On the one hand, open juncture did not necessarily have the phonetic properties of pause, or indeed *any* phonetic properties of its own, which would mean that there was no basis for treating it as a genuine phonological element. On the other hand, to recognize it as a morphological element (for example, to treat the boundary between stem and suffix in *slyness* as constituting open juncture) would constitute an inadmissible importation of nonphonetic criteria, and would therefore violate the 'no mixing of levels' requirement.

In practice, post-Bloomfieldians adopted the 'open juncture' position; they attempted to solve the attendant problem of the lack of phonetic properties in open juncture by defining it as '*potential* pause.'

5. Dissent from the 'Mainstream' View

The work of Bloch and the early work of Hockett, as summarized in Sects. 3.1 and 3.2, can be taken as defining the 'mainstream' view of post-Bloomfieldian phonology. Some of the later developments, for example, the later Hockett and Harris (Sect. 3.3 above), were certainly individual, but did not violate the basic 'orthodoxy' of 'no mentalism' and 'no mixing of levels.'

Other developments, however, were rather more radical, and resulted in a kind of exclusion of their proponents from the 'inner circle' of American phonologists. In Sects. 5.1 and 5.2, two of these developments will be considered:

(a) objections to abandoning meaning difference as a basis for phonemic analysis, and to replacing it with distribution;
(b) the claim that grammatical facts must be taken into account in arriving at a correct phonemic analysis.

In both cases, the chief objector was Kenneth Pike.

5.1 Objections to Distribution as a Basis for Phonemic Analysis

Pike (1947) refers to the general acceptance by post-Bloomfieldians of the need for considering difference of meaning in carrying out phonological analysis. He points out that this is not phonetic information, and so violates the 'no mixing of levels' requirement.

In reply to this, Bloch (1948) postulated that meaning difference was to be replaced in rigorous statements of phonemic procedure by distributional factors, that is, the set of phonetic contexts in which a sound could appear.

Pike (1952) objects that 'distribution only' is not able to achieve the ends for which Bloch and his colleagues have introduced it. If two very similar sounds each occur in the same range of contexts, there are two possible explanations:

(a) The two sounds are free variants of one phoneme;
(b) The two sounds constitute two distinct phonemes.

There is no way of knowing which of these explanations is correct on the basis of distribution, since the two sounds have the same distribution; the only way of resolving the question is on the basis of sameness or difference of meaning.

For example, in a variety of English in which the vowel of *sit*, *pin*, etc. could be pronounced [ɪ] or [e], and the vowel of *set*, *pen*, etc. was always [ɛ], strict phonemic analysts would not be able to determine whether [set] contrasted with [sɪt] or [sɛt], or was in free variation with one or both, unless they knew whether differences of meaning were involved.

5.2 Pike's 'Grammatical Prerequisites to Phonemic Analysis'

Pike (1947) claims that junctures (strictly 'open junctures'—see Sect. 4 above) are in a wide range of languages normally coincident with morphological boundaries, as in the example *slyness* (/slai-nəs/ corresponding with root *sly* + suffix- *ness*). If open juncture is a morphological phenomenon, with no constant phonetic basis, then the principle of 'no mixing of levels' ought to rule it out as a tool of phonological analysis. Therefore, since satisfactory phonological analysis is accepted by post-Bloomfieldians as impossible without 'open junctures,' the final verdict must be that 'no mixing of levels' cannot stand as a basic principle.

Pike also points out that, in many languages, a full account of the phonology cannot be given without reference to the structure of morphemes: knowing which stretches of sound within words constitute morphemes presupposes some grammatical analysis. Here again, the claim 'no mixing of levels' is untenable.

The conclusions which Pike drew from the data which he cited were, however, rejected by most post-Bloomfieldians as too much of a threat to the theory which they had built up. Indeed, his approach came to be known as the 'Pikean heresy.' Interestingly, and surprisingly to many linguists at the time, in preparing *Readings in Linguistics* in 1957 (his history of American linguistics), Joos selected no papers by Pike.

6. 'God's Truth' and 'Hocus-pocus'

A recurring issue throughout the history of science has been the question of whether the units and structures used by the analyst necessarily bear close relationship to the actual phenomena being studied ('realism'), or whether they are merely concepts imposed on the data in arbitrary fashion by the analyst ('nominalism'). Linguistics has been no exception, and the debate first arose in American linguistics in the 1930s (Sect. 6.1), went 'underground' for a while, and was then resurrected in a particularly explicit form by the post-Bloomfieldians in the 1950s (Sect. 6.2).

A question for which the 'God's truth' versus 'hocus-pocus' dichotomy was seen as having clear implications was the possibility or otherwise of whether one and the same language could have two or more different phonological systems. In Sect. 6.3, this is discussed in more detail.

6.1 Realism and Nominalism in the 1930s

In the 1920s, Sapir concluded that intuitions of native speakers about the systems and structures of their language were real, and needed to be reflected in the writing of linguistic descriptions: this goal is clearly a highly 'realist' one. He pointed out that many linguists had recognized that such psychological factors were important in the field of grammatical analysis. One of his distinctive contributions was to extend this approach to the sound systems of language.

Swadesh (1934) in many ways reflects Sapir's approach, as indicated in Sect. 2.1 above.

While Chao also shows 'realist' tendencies ('regard for the feeling of native speakers' is one of his objectives), he moves towards a 'nominalist' position: notably, he questions the assumption that there is only one correct system of phonemes to which the sounds of a language can be reduced (see Sect. 2.2 above). If there are some decisions faced by the phonologist which are not already made by the agreed principles for establishing phonemes, these cannot but be arbitrary decisions which the phonologist has to *impose on* the data, rather than *find in* the data.

Twaddell (see Sect. 2.3 above), having, at least for the time being, ruled out the 'realist' possibility of finding consistent features in sound waves corresponding to phonemes, preferred to take on the more 'nominalist' view of the phoneme as an 'abstractional, fictitious unit.'

In the late 1930s and early 1940s, however, the consensus seems to have been that linguists had to be 'realists.' For phonologists, this meant that phonemic analysis needed to 'hug the phonetic ground' (to use Hockett's phrase), that is, not to depart too far from the facts of pronunciation.

6.2 The Debate in the 1940s and 1950s

Later, the consensus was disturbed by two influences, one from outside American linguistics and the other from within it.

In 1943, Louis Hjelmslev (see *The Glossematic School of Linguistics*) produced his *Omkring sprogteoriens grundlæggelse* (later translated into English as *Prolegomena to a Theory of Language*). In spite of being conceptually difficult, and written in Danish (and therefore inaccessible to most Americans), this book was quite widely reviewed, and made a considerable impact on American linguists, perhaps because of its author's rigorously scientific and 'antimentalist' aims.

One very noticeable difference from the dominant American approach was Hjelmslev's insistence that linguistic units were primarily defined, following Saussure, in terms of their differences from one another, and not in terms of their physical or semantic properties. In phonological matters, this meant that 'hugging the phonetic ground' was not to be encouraged. Phonemes and distinctive features should be defined not *phonetically* but in terms of *abstract* properties such as combinability, and potential for morphophonemic alternation—a rather radical departure from 'realism.'

At about the same time, Harris's work in phonology (see Sect. 3.3 above) was beginning to develop in ways which, while still starting from phonetic factors, worked towards analyses which were increasingly abstract and 'nominalist.'

The differences between 'hugging the phonetic ground' and 'pursuing abstract analyses' were aptly summed up by Fred Householder in the early 1950s in terms of the dichotomy between 'God's truth' and 'hocus-pocus' (terms which were readily adopted by the British linguist J. R. Firth).

The 'God's truth' approach assumes that the language under analysis *objectively has* a structure (one and only one structure), which the linguist must *discover*. Different analysts, applying the accepted methods to identical bodies of data, ought to reach identical results, irrespective of their own subjective prejudices and preferences.

'Hocus-pocus,' on the other hand, views the structure of a language as not being an object amenable to direct observation: analysis is a kind of game in which the analyst seeks to fabricate an *arbitrary* structure which can be appropriately *imposed* on the language. Several quite different structures may fit equally appropriately.

It can be seen that 'God's truth' has much in common with 'realism,' and 'hocus-pocus' with 'nominalism.' The work of some scholars may be readily identified with one or other of these approaches; in fact, most post-Bloomfieldian phonology is of the 'God's truth' variety. It was, however, generally recognized that, at different stages of their analysis, most linguists would be quite likely to adopt one or other extreme position, or any position intermediate between the two.

The chief value of 'hocus-pocus' analyses was seen in their capacity to predict phenomena which had not yet been observed—an essential part of good scientific method. If the predictions of a particular analysis were not borne out by further data elicited from native speakers, this would be important evidence against that analysis. Conversely, if such predictions were borne out by further data, that analysis would be confirmed.

6.3 *Different Structures Coexisting in One Language*

In 1949, Fries & Pike's paper 'Coexistent Phonemic Systems' appeared. They had noted how the entry of loanwords into a language often complicates the analysis of the phonological system.

In words of native origin in Mazateco (a Mexican language), for instance, [t] and [d] are allophones of one phoneme /t/, with [d] always occurring after /n/, and [t] in all other contexts; the sequence [nt] thus never occurs. However, loans from Spanish violate this constraint: *ciento* 'hundred' is pronounced [siento]. Fries & Pike conclude that it is right to recognize a 'Spanish' phonological system which is distinct from the 'native' one, so that /nt/ will be pronounced [nt] in Spanish words and [nd] in native ones.

Bloch (1950) notes analogous problems with Japanese, but takes issue with their solution. The phonemic system of loanwords cannot legitimately be distinguished from that of the native vocabulary, he claims, because linguists and speakers of a language alike are confronted with a single total network of relationships between sounds in that language. Therefore, linguists must likewise produce a correspondingly single description of the language: 'the question how to treat loanwords can have only one answer: treat them as words.'

Although Bloch (1950) never explicitly refers to the 'God's truth' versus 'hocus-pocus' dichotomy, his objections clearly rest on a thoroughgoing 'God's truth' foundation; this is consistent with the whole of his work. It is interesting, and perhaps a little ironic, to note that in almost all his other work of the period, Pike also adopts a solidly 'God's truth' approach.

The already 'hocus-pocus' Fries & Pike view was in fact very similar to J. R. Firth's polysystemicism (see *Firth and the London School of Linguistics*). It was later taken on board and further developed by generative phonologists.

7. Further Reading

A very readable summary of American structuralism is to be found in Lepschy (1970); for a much fuller general account, see Hymes & Fought (1981). Joos (1957) gives a selection of the most influential papers of the 'mainstream' post-Bloomfieldian view, together with some interesting editorial comments on the development of the movement.

In addition to the papers already mentioned, detailed discussions of the phonological aspects of American structuralism are to be found in Fischer-Jørgensen (1975: ch. 6) and Anderson (1985: chs. 8–11).

Bibliography

Anderson S R 1985 *Phonology in the Twentieth Century*. University of Chicago Press, Chicago, Illinois

Bloch B 1941 Phonemic overlapping. *American Speech* **16**: 278–84

Bloch B 1948 A set of postulates for phonemic analysis. *Language* **24**: 3–46

Bloch B 1950 Studies in colloquial Japanese IV: Phonemics. *Language* **26**: 86–125

Bloomfield L 1926 A set of postulates for the science of language. *Language* **2**: 153–64

Bloomfield L 1933 *Language*. Holt, New York

Bloomfield L 1939 Menomini morphophonemics. *Travaux du Cercle Linguistique de Prague* **8**: 105–15

Chao Y-R 1934 The non-uniqueness of phonemic solutions of phonetic systems. *Bulletin of the Institute of History and Philology, Academia Sinica* **4**: 363–97

Fischer-Jørgensen E 1975 *Trends in Phonological Theory*. Akademisk Forlag, Copenhagen

Fries C C, Pike K L 1949 Coexistent phonemic systems. *Language* **25**

Harris Z S 1944 Simultaneous components in phonology. *Language* **20**: 181–205

Harris Z S 1951 *Methods in Structural Linguistics*. University of Chicago Press, Chicago, Illinois

Hjelmslev L 1943 *Omkring, sprogteoriens grundlaeggelse*. Munksgaard, Copenhagen

Hockett C F 1942 A system of descriptive phonology. *Language* **18**: 3–21

Hockett C F 1947 Peiping phonology. *Journal of the American Oriental Society* **67**: 253–67

Hockett C F 1955 *A Manual of Phonology*. Indiana University Publications in Anthropology and Linguistics, Memoir 11. Waverly Press, Baltimore, Maryland

Householder F W 1952 Review of Harris 1951. *International Journal of American Linguistics* **18**: 260–68

Hymes D, Fought J 1981 *American Structuralism*. Mouton, The Hague

Joos M (ed.) 1957 *Readings in Linguistics*. American Council of Learned Societies, Washington, D.C.

Lepschy G C 1970 *A Survey of Structural Linguistics*. Faber & Faber, London (2nd edn., 1981)

Moulton W G 1947 Juncture in Modern Standard German. *Language* **23**: 212–26

Pike K L 1943 *Phonetics*. University of Michigan Press, Ann Arbor, Michigan

Pike K L 1947 Grammatical prerequisites to phonemic analysis. *Word* **3**: 155–72

Pike K L 1952 More on grammatical prerequisites. *Word* **8**: 106–21

Pike K L, Pike E V 1947 Immediate constituents of Mazateco syllables. *International Journal of American Linguistics* **13**: 78–91

Swadesh M 1934 The phonemic principle. *Language* **10**: 117–129

Swadesh M, Voegelin C F 1939 A problem in phonological alternation. *Language* **15**: 1–10

Trager G L, Bloch B 1941 The syllabic phonemes of English. *Language* **17**: 223–46

Trager G L, Smith H L 1951 *An Outline of English Structure*. Studies in Linguistics, Occasional Papers **3**. Battenberg Press, Norman, Oklahoma

Trubetzkoy N S 1939 *Grundzüge der Phonologie. Travaux du Cercle Linguistique de Prague* **7**

Twaddell W F 1935 *On defining the phoneme. Language Monographs* **16**

Tagmemics

Linda K. Jones

Tagmemics is a theory of language primarily, but also of all human behavior, both verbal and nonverbal. It emphasizes the hierarchical structuring of language in each of three domains—phonology, grammar, and reference. The theory was initially developed by Kenneth Pike, who named the basic units 'tagmemes,' creating a new concept for a term borrowed from Leonard Bloomfield (who had coined the term from a Greek word meaning 'rank, arrangement'). In Pike's usage, the tagmeme is a complex 'unit-in-context': it is complex because every unit embodies a number of features and it is a unit-in-context because part of its definition is its distribution in some larger context.

Theoretical development in tagmemics has always been coupled with a strong emphasis on analytical methodology. Tagmemic methodology has been frequently applied to the analysis of languages in a field situation and has proved especially useful in tackling the analysis of languages about which little or nothing has ever been written. As a result, tagmemics directly or indirectly underlies the documentation of several hundred little-known languages.

1. Historical Development

The roots of tagmemics are in American Structuralism, although it has grown beyond structuralism in some very important ways (see *American Structuralism*). The work of Edward Sapir, Leonard Bloomfield, and Morris Swadesh influenced Kenneth Pike's early work. In the 1940s he made important contributions in phonology in the areas of phonetics, phonemics, tone, and intonation. In 1948 Pike turned his attention to grammar. Having seen the fruitfulness of the concept of the phoneme in phonology, he posed a research question for himself: Might there be 'a phoneme of grammar,' that is, a minimum structural unit relevant to grammatical analysis? He named this theoretical construct a 'grameme,' meaning 'minimal emic unit of grammar.'

By 1954 Pike had worked out the broad outline of a new theory of grammar, which, in actuality, went well beyond grammar. The first major publication to present the new theory was *Language in Relation to a Unified Theory of the Structure of Human Behavior* (*LRUTSHB*), published in three parts. By the time Part III appeared in 1960, the term 'tagmeme' had come to replace the term 'grameme' for the same concept. The tagmeme was conceived of as the minimum unit of grammar and was a correlation of slot and class. The slot is the functional position that the unit occupies as its part in the larger whole. The class is the set of items which may occupy that slot. The new theory proposed that language has three simultaneously manifested structures—phonological, grammatical, and lexical—which are hierarchical in nature.

Pike was especially concerned to demonstrate the integral nature of language with human behavior in general, and so included in *LRUTSHB* detailed analyses of both verbal and nonverbal components of a church service, a football game, and a family breakfast scene. He emphasized the importance of keeping the larger context—both linguistic and behavioral—in view in proceeding with analysis. By insisting on starting with some understanding of the top levels of structure, Pike led the way in discourse analysis, in an era when anything beyond the sentence was considered outside the scope of linguistics altogether.

Through his leadership in the Summer Institute of Linguistics (SIL), Pike was able to encourage practical application of his theory. During the 1950s and 1960s many tagmemic descriptions of languages were produced, especially by SIL linguists. (Annotated listings of approximately 400 publications in tagmemics appear in Pike 1966 and Brend 1970, 1972.) This intensive study impacted the development of the theory, resulting in some changes and further elaboration.

During this period, Robert Longacre became very influential in the development of tagmemics. One of his innovations was to abandon the concept of the tagmeme as merely a minimum unit of grammar and instead to extend the notion of the tagmeme throughout the entire grammatical hierarchy. He also worked out criteria for establishing contrast between constructions and in 1964 published *Grammar Discovery Procedures*, a field manual for grammar.

Pike's magnum opus on tagmemic theory, *LRUTSHB*, was republished in a revised second edition in 1967, and incorporated the various changes in the theory. A major new emphasis in this edition is on the complementary perspectives of 'particle, wave, and field,' imagery which was borrowed from physics to describe three different observer perspectives. The 1960s found fruitful application of the new particle, wave, field perspectives in the analysis of languages.

Stimulated by Charles Fillmore's case studies, tagmemic research began to focus on semantic roles and ways to capture these in the tagmemic formulas. Early formulas of tagmemes were simply a two-part correlation of functional slot and filler class. But now, trying to incorporate semantic roles, four-part and even nine-part tagmemes were proposed (the latter incorporated a good deal of lexical structure as well). Eventually a four-part (called 'four-cell') representation for the tagmeme was chosen by Pike, while Longacre stood by the traditional two-part tagmeme. *Grammatical Analysis* (1977), a textbook in tagmemics, utilizes the four-cell tagmeme.

In the 1970s, Pike, his wife Evelyn, and some of Pike's graduate students at the University of Michigan, focused attention on the lexical hierarchy, which had been largely neglected. Their work resulted in a substantially new understanding of this hierarchy. Since it was no longer a 'superlexicon,' the label 'lexical' for this hierarchy was discarded, replaced by the term 'referential.' A number of studies in the 1980s also contributed to the development of the referential hierarchy (see, for example, Howland 1981).

Meanwhile, Longacre had been focusing increasingly on the higher levels of the grammatical hierarchy. He has made important contributions in these areas and published a textbook *The Grammar of Discourse* (1983). Through supervising his graduate students at the University of Texas at Arlington, and in directing SIL workshops in the Philippines, New Guinea, Colombia, Mexico, and West Africa, he has stimulated numerous studies of sentences, paragraphs, and discourses in scores of languages.

2. Basic Assumptions

Tagmemic theory rests on certain basic assumptions. These have been expounded in numerous of Pike's publications, the fullest presentation being *Linguistic Concepts* (1982), while a more philosophical presentation is *Talk, Thought, and Thing* (1993). While these assumptions are formulated particularly with language in mind, they also are held to be true for all human behavior, of which language is just a part. They are statements about the nature of human behavior at a very deep level, and in fact, of the nature of human rationality. The assumptions overlap and they are not ordered.

One basic assumption is that there is always an 'observer perspective' on the data. There is no such thing as a detached, impartial perspective on any data; there is always an observer, looking at and filtering the data from his perspective. However, the observer's perspective is not fixed and by shifting perspective, he may gain new insights into the data. As already mentioned, there are three complementary observer perspectives: 'particle,' 'wave,' and 'field.' (The terms are taken from physics, where light is best explained as being simultaneously composed of particles and of waves, with its energy distributed in a field.) The three perspectives are alternant ways of viewing the same data, leading to different insights. A particle perspective focuses on the discrete, individual items in the data, the wave perspective considers the indeterminacy of borders, and the field perspective observes relationships between items and the patterns of the overall system. For example, in analyzing a stream of speech, a particle perspective views the stream as composed of a sequence of discrete sounds or phones. A wave perspective, on the other hand, recognizes the smearing of sounds into each other, which would show up on a sound spectograph. A field perspective might make a phonetic chart inventorying the sounds found in the stream of speech in order to study patterns in the system.

There is another way in which tagmemics talks about observer perspective, and that is the difference between the alien/outsider perspective, called 'etic,' and the native/insider perspective, called 'emic.' Pike coined the terms 'etic' and 'emic,' based on 'phonetics' and 'phonemics,' to describe comparable differences in perspective on other behavioral data. An etic perspective analyzes a unit as similar in kind to units appearing elsewhere, in other languages or cultures, and in this sense, is a universal approach. An emic approach considers rather the relevance of a unit to only a single language or culture, with a concern to describe its unique system. A linguist necessarily approaches any language other than his own with an etic perspective, but through analysis, he hopes to gain an emic perspective by discovering the linguistic system as it is perceived by the native speakers.

A second set of assumptions in tagmemics concerns 'units.' In tagmemic theory, units are primitive notions, which are defined by their 'contrastive–identificational features,' their 'range of variation,' and their 'patterns of distribution in various contexts.' A unit may be shown to contrast with another unit because of certain differences in features, yet its features also help to identify a unit even in the absence of some kind of contrast. The differences between two units may be so slight as to consist of merely one feature, such as the presence or absence of aspiration on a stop, or the differences may consist of a bundle of features. Since a unit may exhibit certain variations in form and still be considered the same unit, its range of variation must be determined. Finally, a unit is defined by its privileges of occurrence, that is, its distribution patterns in context.

Spanish verbs will illustrate the assumptions regarding units. There are three major classes of verbs in Spanish, which contrast by their infinitive form endings: *ir*, *er*, and *ar*. All verbs exhibit form changes due to inflections of person, number, and tense-mood. The greatest variation is seen in irregular verbs which show substantive stem changes, such as the verb *ir* 'to go,' with three different stem forms, as in *fuí*, *voy*, and *iré* for the past perfective, present, and future, respectively, of the first person singular. Every verb has its own distributional patterns; for example, the verb *ir* 'to go' occurs primarily in intransitive clauses.

There is yet another assumption that tagmemics makes about units: they are 'form-meaning composites.' Tagmemics differs at this point from those linguistic theories which separate form from meaning, assigning formal structures to grammar or syntax, and meaning to semantics. Tagmemic theory insists on keeping form and meaning together. Isolation of forms is untenable, since in natural language, forms always occur in some context, and it is context that shapes meaning. A form derives its meanings from its contexts, and is therefore best analyzed in relation to its meanings-in-context.

The assumption regarding units as form-meaning composites is one of a set of principles which may loosely be related under the term 'context.' One of the other principles regarding context is that 'change occurs via a shared element in a shared context.' There must always be some bridge over which the change passes. An obvious example is a portmanteau phone that results from the fusion of two sounds that are contiguous. Another example is the new meaning that a basically intransitive word acquires when it is used in a transitive clause, e.g., intransitive *hop* becomes transitive in *He hopped a train to New York*.

Another assumption regarding context is the inseparability of speech from its behavioral context. Language does not occur in a cultural or conceptual vacuum, but is contextualized in social interactions. For a text to be coherent, the words and concepts in the text must be relatable in some 'universe of discourse,' or 'frame of reference'; otherwise, communication breaks down. Shared vocabulary, shared beliefs, expectations, and cultural norms all underlie coherent communication. The universe of discourse provides the network of relationships which tie the parts of a text together into an integrated whole.

The assumptions just outlined concerning observer perspective, units, and context are sufficiently broad as to be congenial to many theories. They are not even all specifically assumptions about language; they are assumptions about human behavior, and thus could underlie a theory in some nonlinguistic field, e.g., anthropology or sociology. There are, however, some additional assumptions made in tagmemic theory that distinguish it in fundamental ways from other theories. Chief among the unique distinctives of tagmemics are the hierarchical principle and the tagmeme concept.

3. The Hierarchical Principle

The hierarchical principle is axiomatic in tagmemics. This principle makes a number of important claims. First, there is structure 'beyond the sentence,' not just loose network relations. Second, the structure that is 'beyond the sentence' is in some fundamental way the same as the structure 'below the sentence.' That is, the view is rejected that nouns, verbs, clauses, and sentences exhibit linguistic structure, but paragraphs and larger discourses either have no structure at all, or only have a radically different kind of structure that is better called something else. Tagmemics claims that all these have a similar kind of structure, which is a constituent structure characterized by part–whole relations of units in constructions.

This is where hierarchy comes in. Small units are parts of larger whole units on another level of organization, which in turn, are parts of wholes on yet another level of organization, and on up the hierarchy. This is not a taxonomic hierarchy organized by generic-specific relations; it is a 'part–whole hierarchy,' of small chunks within larger ones within yet larger ones.

A small number of specific levels are posited in the hierarchy, each level being defined by a set of form-meaning features. It is suggested that the levels are generally relevant to all languages, although not all levels are present in every language. Linguistic analysis may begin at any one of the levels. Constructions at one level in the hierarchy will be found to consist of units from other levels. Thus, analysis begins at one level but soon proceeds to other levels.

Tagmemics holds that there are three domains of language—'phonology,' 'grammar,' and 'reference'—which all are structured hierarchically. However, this is not a monistic structure building from reference to grammar to phonology (nor the opposite direction). Rather, there are three 'side-by-side' hierarchies, each independent with their own forms and meanings, yet at the same time not totally separate since they interlock as well, with some overlapping. While there are many normal correspondences of levels in one hierarchy to particular levels in the other hierarchies, there is no one-to-one isomorphism.

Of the three hierarchies, the phonological is the one that shows the most variation in which levels are present from language to language. The levels generally present are (from highest to lowest):

(a) pause group;
(b) phonological phrase (alternatively: stress group, contour);
(c) phonological word (alternatively: stress group, rhythm group, foot);
(d) syllable;
(e) phoneme.

Sometimes other higher levels are posited, such as phonological sentence, phonological period, or utterance-response. The tagmemic phonological hierarchy has been most fully developed by Eunice Pike.

In the grammatical hierarchy, the emic levels postulated are (from highest to lowest):

(a) conversation;
(b) conversational exchange;
(c) monolog discourse;
(d) paragraph;
(e) sentence;
(f) clause;
(g) phrase;
(h) word;
(i) stem;
(j) morpheme.

(A conversational exchange is defined as just one turn by each speaker, while a conversation may consist of any number of turns by the speakers.) There are both significant differences and significant similarities between contiguous levels. Longacre views the grammatical hierarchy as a simple ascent from morpheme to monolog discourse. Pike & Pike, however, have suggested that there is pairing of the levels: the levels of a pair share a similar meaning, but differ in that one comprises minimal constructions while the other comprises expanded constructions. Thus, morpheme and stem express a lexical package, but the morpheme in a minimal way, the stem in an expanded way. Word and phrase both express a term, but the word minimally, and the phrase in an expanded way. Clause and sentence both express propositions, but the clause is a minimum construction, while the sentence is an expanded one. Similarly, both paragraph, as a minimum, and monolog discourse, as an expansion, express theme-development. Finally, the conversational exchange is a minimum social interaction, while conversation is an expanded interaction.

The third hierarchy is the referential hierarchy. In tagmemic theory, reference means whatever language refers to, that is, whatever is 'talked about'—whether things, people, events, or abstractions. Note that it is not actually the 'real' world nor the 'real' thing-in-itself nor the 'real' people, since our only access to these is through observers. People observe the world about them, or ponder the world of ideas and feelings within them, or imagine something, and then talk about these things using the phonological and grammatical structures of their language. The content structure of what is said, the 'talk-concepts,' are the subject matter of reference in tagmemics. It is evident that the talk-concepts of a language are almost endless. A list of these would be rather like an encyclopedia, which may include a great deal of information about any particular entry.

The levels posited in the referential hierarchy are (from highest to lowest):

(a) performative interaction;
(b) story;
(c) event;
(d) identity (person or prop);
(e) relationships.

In addition to dealing with the content structure of stories with their events, participants, and items, certain intangibles are also dealt with in the referential domain. For instance, purpose of a person or an event, beliefs, truth and falsity, expectations and clashes with expectations, are all treated in reference, since these participate in the meaning and coherence of any text.

Referential units must not be confused with grammatical units. Any one referential unit can be expressed in multiple grammatical forms, which constitute a 'paraphrase set' for that referential unit. For example, a person might be referred to by his given name, a nickname, his family relationship (e.g., *father*), his social role (e.g., *headmaster*), or some other kind of label (e.g., *that scheming man*). There is just one man, a single referential identity, who may be referred to by numerous grammatical forms. There is another important difference between reference and grammar. In referential structure, events are in strictly chronological order, but the grammatical telling may result in reorderings of the events.

4. The Tagmeme

The tagmeme is a very basic concept in tagmemics. It was originally worked out in the domain of grammar, and later extended to phonology and reference. This section deals with the tagmeme in grammar.

Every construction, such as phrase, clause, sentence, or paragraph, is composed of units which are called 'tagmemes.' This 'Law of Composition' expresses a fundamental part–whole relationship—'tagmemes' are the parts, 'constructions' (also called 'syntagmemes') are the wholes. There are construction types which correspond to each emic hierarchical level above the 'zero,' or morpheme, level. The construction types in grammar, then, are stem, word, phrase, clause, sentence, paragraph, and on up the grammatical hierarchy. Every construction is composed of tagmemes. Tagmemes are the basic building blocks of linguistic structure.

From the beginning of tagmemic theory, however, these basic units, the tagmemes, have not been simple units. They are a complex of both form and meaning. Every tagmeme is described by its functional position 'correlated with' the class or set of words, phrases, or whatever that may occur in that position. That is, the tagmeme is a correlation of 'function slot' with 'filler class.'

The analysis of a simple example will illustrate the tagmeme concept. In a simple transitive clause in English there are generally three obligatory tagmemes: a subject slot 'filled by' or 'manifested by' the class of nouns or noun phrases, plus a predicate slot filled by the class of transitive verbs/verb phrases, plus an object slot filled by the class of nouns/noun phrases. Each of these three tagmemes is a complex of its slot or function in the clause plus the part of speech or classes of words or phrases which are found there. It is not enough to describe the parts of the transitive clause as subject, predicate, and object, nor is it adequate to list a sequence of word classes, e.g., NP VP NP. Tagmemics insists on keeping together the functional categories and the part of speech categories.

Now the relationship between a tagmeme and a construction may be elaborated. A construction is composed of tagmemes. In turn, every tagmeme is manifested either by a simple morpheme (zero-level manifestation) or by another construction. Thus, tagmemes make up constructions, on the one hand, and, on the other hand, are themselves filled by other constructions. Via the tagmeme, there is nesting of constructions within constructions, which reflects the hierarchical nature of language.

In the simplest situation, constructions on one level are composed of tagmemes which are filled by constructions from the next lower level. Longacre calls this type of simple descent 'primary exponence.' Frequently in language, however, there are other 'degrees of exponence.' Level-skipping to zero is very common, whereby a single morpheme manifests a tagmeme of some higher-level construction, e.g., *and* as the coordinating link in coordinate constructions. There is level-skipping to other than zero as well. Recursion is also common in languages, whereby a construction type nests within its same type, e.g., phrase within a phrase, as in *the life cycle of the monarch butterfly*. Backlooping occurs when a high-level construction occurs as a constituent of a low-level construction. The most prevalent form of backlooping is the embedding of a relative clause in a noun phrase.

The tagmeme was originally a two-feature unit: function slot plus filler class. Later the necessity of distinguishing tagmemes which had the same slot and class, but differed by semantic role, as for example, the subject noun phrase in *The boy hit his sister* versus *The boy was hit by his sister*, led to Pike's adding 'semantic role' to the definition of the tagmeme. With this new feature, a tagmemic analysis mentions three features: slot, class, and semantic role. In the preceding example, *the boy* is 'subject-as-actor filled by a noun phrase' in the first instance, and 'subject-as-undergoer filled by noun phrase' in the second.

About the same time, Pike added a fourth feature of the tagmeme: 'cohesion,' which expresses the 'governing–governed' relationship between one tagmeme and others in the context. For example, in many European languages, the gender of a noun requires an agreeing gender marking on its associated adjectives. In tagmemic terminology, the noun is said to 'govern gender cohesion,' while the adjectives are 'governed by gender cohesion.' Often it is useful to spell out the nature of the governing relationship in an explicit cohesion rule.

5. Notations

Notations are useful representational devices, but tagmemics attaches no theoretical significance to the formalisms it usually employs. Two notations became prevalent early in tagmemic history, which focused on representing constructions as strings of two-feature tagmemes. For example, a simple transitive clause of English might be represented as S:NP P:VP O:NP or as S^{NP} P^{VP} O^{NP}. Both these tagmemic formulas are read the same way: 'Subject filled by noun phrase, followed by predicate filled by verb phrase, followed by object filled by noun phrase.'

The evolution of the tagmeme in Pike's theory into a unit of four features complicated the notational system, but eventually a four-cell array was chosen to represent the tagmeme, represented in (1):

$$\begin{array}{c|c} \text{Slot} & \text{Class} \\ \hline \text{Role} & \text{Cohesion} \end{array} \tag{1}$$

A tagmemic formula is a linear representation of structure. For example, the sentence *The little boy was feeding some ducks* is an active transitive clause which, using four-cell tagmemes, may be formulized as in (2):

$$\begin{array}{c|c} \text{S} & \text{NP} \\ \hline \text{A} & \# > \end{array} \quad \begin{array}{c|c} \text{P} & \text{VP} \\ \hline \text{Sta} & > \# \end{array} \quad \begin{array}{c|c} \text{Ad} & \text{NP} \\ \hline \text{U} & — \end{array} \tag{2}$$

The abbreviations are: *S* 'subject,' *A* 'actor,' *NP* 'noun phrase,' *P* 'predicate,' *Sta* 'statement,' *Ad* 'adjunct,' and *U* 'undergoer.' The symbol # indexes a number cohesion rule (which is written in detail elsewhere). The symbol > to the right of # indicates that this tagmeme governs the cohesion rule, while > to the left of # indicates that that tagmeme is governed by the cohesion rule.

Tagmemic formulas are most useful when they represent the contrastive construction types in a language, that is, when they are formulaic generalizations which hold for all instances in the data of an emic type, e.g., all active transitive clauses. In order to handle a larger corpus of data, the class cell of each tagmeme lists all the contrastive filler classes which have been found to occur with that particular tagmeme. For example, the subject tagmeme in a generalized formula for transitive clause would need to list classes in addition to noun phrase which may occur, e.g., coordinate noun phrase, pronoun, pronoun phrase, nominalized clause, participial phrase, and so forth.

Another way to generalize a formula is to distinguish those constituents which are 'obligatory' from those that are 'optional.' A constituent is obligatory if and only if it occurs in every normal example of a construction; otherwise it is optional. Optional constituents present variants of the construction. In the English active transitive clause type, the adjunct-as-undergoer tagmeme may be deleted in certain situations, and is therefore optional. For example, the clause *A careless pilot crashes his plane* may be abbreviated to *A careless pilot crashes.* By contrast, in the passive transitive clause type, it is the adjunct-as-actor tagmeme which is optional. Passive versions would be *The plane was crashed* (*by a careless pilot*). In tagmemic notations, obligatoriness or optionality of a constituent is marked preceding it, denoted by a plus sign + for obligatory and a combined plus-minus sign ± for optional.

6. Applications

Although tagmemics is primarily a theory for linguistics, the principles of tagmemics have inspired many studies in other fields as well. The theory has been applied to other language-related fields, such as bilingual education, language learning, literature, rhetoric and composition. Anthropologists for many years have utilized the etic and emic concepts, without always realizing where they originated (cf. Headland, et al. 1990). The social structure of ethnic groups has been studied using tagmemic principles. The field of ethnomusicology (study of indigenous music systems) has relied heavily on some of the tagmemic principles, again especially the etic–emic distinction. Even more remote fields, such as theology, have been touched by tagmemic studies.

Within linguistics, a great many languages around the world have been described in the tagmemic model. Included in the list are indigenous languages of Mexico, Guatemala, Peru, Brazil, Ecuador, Colombia, Nepal, India, the Philippines, Indonesia, Papua New Guinea, and West Africa.

Bibliography

Brend R M 1970, 1972 Tagmemic theory: An annotated bibliography, with appendix. *Journal of English Linguistics* **4**: 7–41, **6**: 1–16

Headland T N, Pike K L, Harris M (eds.) 1990 *Emics and Etics: The Insider/Outsider Debate*, Frontiers of Anthropology, vol. 7. Sage Publications, London

Howland L G 1981 Communicational integration of reality and fiction. *Language and Communication* **1**: 89–148

Longacre R E 1964 *Grammar Discovery Procedures: A Field Manual.* Mouton, The Hague

Longacre R E 1983 *The Grammar of Discourse.* Plenum Press, New York

Pike K L 1954, 1955, 1960 *Language in Relation to a Unified Theory of the Structure of Human Behavior.* (2nd rev. edn., 1967) Mouton, The Hague

Pike K L 1966 A guide to publications related to tagmemic theory. In: Sebeok T A (ed.) *Current Trends in Linguistics. Vol. III: Theoretical Foundations.* Mouton, The Hague

Pike K L 1982 *Linguistic Concepts: An Introduction to Tagmemics.* University of Nebraska Press, Lincoln, Nebraska

Pike K L 1993 *Talk, Thought, and Thing.* Summer Institute of Linguistics, Dallas, Texas

Pike K L, Pike E G 1977 *Grammatical Analysis. Summer Institute of Linguistics, Publications in Linguistics*, Dallas, Texas

Stratificational Grammar

David C. Bennett

An account of syntax within the framework of stratificational grammar (SG) needs to be understood in the context of the theory as a whole. Developed by Sydney M. Lamb from the late 1950s onwards, SG has inevitably undergone various kinds of revisions over the years, but most versions reflect the following three basic assumptions: (a) the information constituting a language is appropriately represented as a network of relationships; (b) within the network as a whole can be identified certain distinct levels, or 'strata'; and (c) to model various linguistic processes, networks need to be considered also from a dynamic point of view. Section 1 expands briefly on each of these basic assumptions; Sect. 2 reviews relevant accounts of syntax; and Sect. 3 summarizes work on modeling linguistic processes. Section 4 re-examines the notion of stratification.

1. The Basic Assumptions

1.1 A Network of Relations

The view of a language as a network of relations is present in Saussure (1949) but is even more prominent in Hjelmslev (1961), from where it was taken into SG. Figure 1 shows a highly simplified fragment of a network grammar of English. Of particular interest is the fact that part of the network corresponds to a simple phrase structure grammar (PSG) whereas the remainder of the network represents part of the lexicon. Thus, the section of the diagram on the right is a network version of the following PSG:

S → NP V (NP) (PP)
NP → Det N (S)
V → {*enter*, *arrive*, . . .}
PP → prep NP
prep → {*to*, *into*, *at*, *in*, . . .}.

The lexicon, on the other hand, contains the items *enter*, *arrive*, *to*, *into*, *at*, and *in*, and shows the concepts to which these items are connected (at the top of the diagram) and something of their phonological structure (at the bottom). Wherever two items are similar in some respect—either semantically or phonologically, or in terms of their syntactic distribution—what they share is explicitly represented in the connections within the network.

In the terminology of SG, the vertical dimension of the diagram, which connects semantic components such as 'goal' ultimately to phonological components such as /Nasal/, is known as the 'realizational structure.' On the other hand, the section corresponding to a PSG would be referred to as the 'lexotactics.' (This term is modeled on the more familiar term 'phonotactics,' with 'lex-' substituted for 'phon-' since the ultimate constituents of the lexotactics are 'lexemes,' or lexical items.) The lexotactics can be thought of as being horizontal and located at a particular level of the realizational structure. Diamond-shaped nodes are used where lines of the lexotactics connect to lines in the realizational structure. They represent a special kind of AND node: lexemes have a particular meaning *and* a particular phonological structure *and* a particular syntactic category membership. Otherwise, AND nodes are triangular in shape. The three AND nodes in the lexotactics represent constructions: the sentence, noun phrase, and prepositional phrase constructions. These three nodes are also 'ordered': the left-to-right order of the lines at the bottom shows the order in which the various constituents occur. They are also 'downward' ANDs: they branch in a downward direction. The ordered downward ANDs in the bottom half of the realizational structure represent the phonological structure of particular lexemes (either in terms of syllables or in terms of phonological segments). On the other hand, the AND node showing /n/ as having the phonological components /Apical/ and /Nasal/ is an 'unordered' downward AND (since the components are simultaneous rather than sequential). In the top half of the realizational structure, unordered AND nodes occur also with 'upward' branching, representing particular combinations of semantic components. The remainder of the nodes in Fig. 1 are OR nodes. They represent, inter alia, alternative members of syntactic categories (e.g., the category of prepositions), alternative slots in which noun phrases may occur, and alternative realizations of particular concepts or combinations of concepts (for more detailed discussion of the notation, see Lamb 1966; Lockwood 1972).

1.2 Strata

One way in which the grammar of Fig. 1 can be improved upon is by including a phonotactics, so that it would specify possible combinations of phonological elements of various sizes (including phonological components, segments, and syllables). Similarly, a further PSG can be added to specify possible combinations of concepts such as 'goal' and 'interior.' This would indicate, for instance, that 'goal' is related syntagmatically to the concepts 'source' and 'path,' the three concepts representing the three phases of a change of position; and that 'interior' is related paradigmatically to concepts such as 'surface,' 'anterior,' and 'posterior' (see Sect. 2.2 and Bennett 1975: 132–76). If concepts such as 'goal' and 'interior' are referred to as 'sememes,' this latter PSG can be referred to as the 'semotactics.' Finally, if a separate

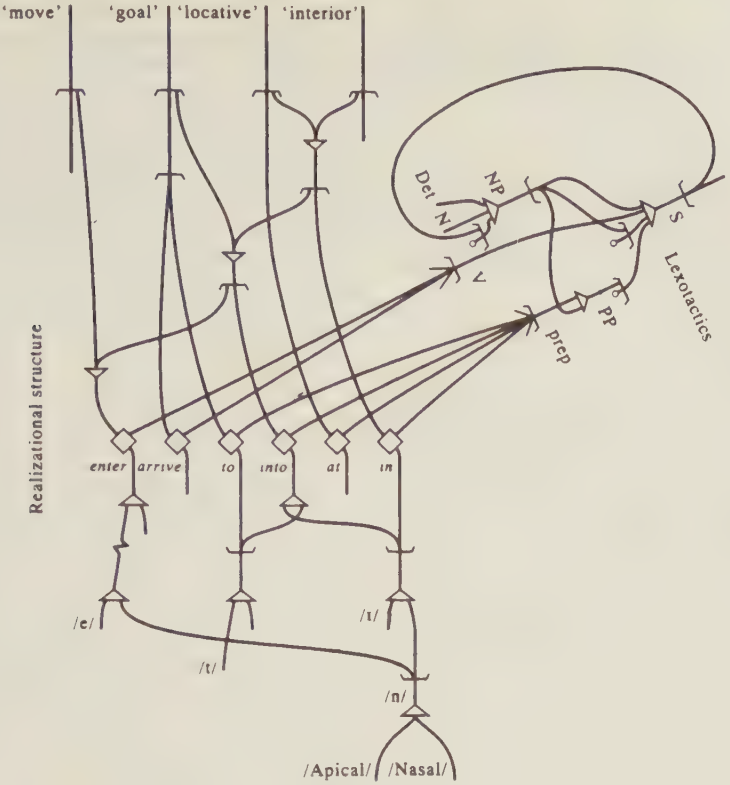


Figure 1.

'morphotactics' is included, to characterize the composition of words in terms of morphemes, the result is an overall grammar that can be represented schematically as in Fig. 2, which corresponds to a SG with four strata.

A stratum is a level of language, or module of the overall grammar, but with the proviso that each stratum is regarded as having essentially the same kind of structure as all the other strata. In particular, each stratum of Fig. 2 has its own 'tactic pattern,' or PSG, and the implication is that there is independent patterning of language at these four levels. The similarities between strata extend also to the realizational structure. Thus, the alternation between *a* and *an* (as in *a banana* versus *an orange*) involves the same relationship as that between *although* and *despite* (as in *although it was raining* versus *despite the rain*), but at a different level—the former morphophonemic, the latter semolexemic.

1.3 *Linguistic Processes*

Stratificational grammar has never been content to concentrate on 'competence' to the exclusion of 'performance.' Rather, it has set out to provide an account of a language that can be used as the basis for a performance model. The processes of producing and understanding specific utterances are thought of in terms of signals passing through the network of the grammar, either from semantics to phonetics or from phonetics to semantics. Besides production and comprehension, attention has been given also to the network modification involved in the processes of language acquisition and linguistic change.

For two reasons, SG claims to represent a brand of 'cognitive linguistics,' constituting an improvement on 'generative linguistics.' First, its main objective is to model linguistic processes. Second, it assumes not only that a speaker's linguistic system takes the form of a network but also that all of his/her knowledge, both general and specific, is stored in a similar form in a 'cognitive' network; and it is therefore concerned with the interrelationship between the linguistic network and this wider cognitive network.

2. Syntax

2.1 *Selected Topics in Syntax*

Stratificational accounts of the relationship between active sentences such as (1) below and corresponding passives such as (2) and (3) are to be found, for

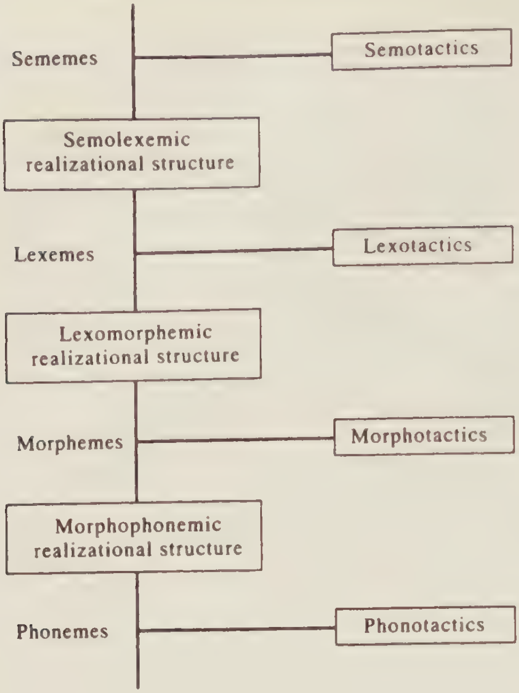

Sememes
Semotactics
Semolexemic realizational structure
Lexemes
Lexotactics
Lexomorphemic realizational structure
Morphemes
Morphotactics
Morphophonemic realizational structure
Phonemes
Phonotactics

Figure 2.

instance, in Lockwood (1972: 144–49) and Sullivan (1980: 320–23):

The teacher gave a prize to the two most helpful pupils. (1)

A prize was given to the two most helpful pupils (by the teacher). (2)

The two most helpful pupils were given a prize (by the teacher). (3)

Although the analyses differ in certain respects, on crucial details they are in agreement. They involve the semotactics and lexotactics and the intervening realizational structure. The semotactics incorporates a set of participant roles, and in these examples *the teacher*, *a prize*, and *the two most helpful pupils* are associated with the roles of ‘agent,’ ‘patient,’ and ‘recipient’ respectively. The choice of subject in the lexotactics, or surface structure syntax, is determined by the selection of the sememe ‘focus’ in the semotactics. This sememe can be attached either to the ‘patient’ or to the ‘recipient.’ In either case, the particular combination of sememes triggers a lexotactic order in which the noun phrase in question is realized as the subject. It also causes the verb to be marked as passive. The ‘agent’ noun phrase (if present) then occurs postverbally, its function signaled by the preposition *by*. In the unmarked case where ‘focus’ is not attached to ‘patient’ or ‘recipient,’ the ‘agent’ noun phrase occupies the subject position. One characteristic feature of the analysis is that there is no linear order in the structure produced by the semotactics. Thus, in realizing it as a surface syntactic structure, there is no transformation of one linear order into another. Instead, the order of constituents is determined by the lexotactics on the basis of the sememes present in the sememic representation.

Sullivan’s (1978: 58) analysis of ‘raising’ data such as the examples in (4) and (5) below depends on the possibility of a noun phrase having two distinct participant roles simultaneously:

I expect that Ed will leave. (4a)

I expect Ed to leave. (4b)

I ordered that Ed remove Bob from the room. (5a)

I ordered Ed to remove Bob from the room. (5b)

In the sememic representation of the (b) examples, ‘Ed’ has one role in relation to the first verb and one in relation to the second, whereas in the (a) examples it has no role in relation to the first verb. Thus, in (5b), ‘Ed’ is ‘recipient’ with respect to ‘order’ and ‘agent’ of ‘remove,’ whereas in (5a) it is only ‘agent’ of ‘remove.’ The presence of two roles associated with the same participant then triggers the production, by the lexotactics, of the infinitival construction rather than a clause introduced by *that*. Support for this analysis comes from (6):

I ordered that Bob be removed from the room by Ed. (6a)

?I ordered Bob to be removed from the room by Ed. (6b)

The oddity of (6b) depends on the fact that ‘Bob’ is the ‘recipient’ in relation to ‘order’ but only ‘patient’ of ‘remove.’ In other words, Bob is apparently being ordered to carry out an action over which he has no control. (There is no problem with (6a), since Bob is not the ‘recipient’ of ‘order’ in this example.)

While agreeing in general with Sullivan’s dual-role analysis, Anderson (1978: 155–63) draws attention to the problem of (7):

I expect that it will be raining by 3 pm at the latest. (7a)

I expect it to be raining by 3 pm at the latest. (7b)

As the dummy subject of a weather verb, ‘it’ can hardly be an argument of ‘expect’ in (7b). But if the sememic structure of (7b) does not parallel that of the other (b) examples, this must be an analogical extension of a surface-structure pattern. Moreover, such an interpretation of the data supports the claim of independent semantic and syntactic patterning reflected in the distinction between semotactics and lexotactics.

This discussion of selected topics in syntax concludes by referring to Sampson’s (1980: 182) comments on relative clauses. In general Sampson is sympathetic to SG and lists a number of respects in which it compares very favorably with Chomskyan linguistic theory, including its greater overall conceptual simplicity, the notion of independent patterning at different levels and its plausibility as a model of the production and comprehension of utterances (1980: 172–80). He also mentions the simplicity measure for grammars that was developed within the framework of SG (Reich 1973). However, Sampson ends on a negative note. While agreeing with Bloomfield (1933: 213) that a 'process' account of the relationship between *knife* and *knives*—according to which *first* the [f] at the end of *knife* is voiced and *then* the [z] form of the plural is added—is merely a convenient descriptive fiction, Sampson continues (1980: 181)

> ... when one investigates syntax more deeply than Bloomfield did, one finds the data to be such that, arguably, only process rules can handle them.

He regards English relative clauses as a case in point (1980: 182):

> The obvious way of stating the facts is to say that relative clauses are formed from normal sentences by deleting one of their nominal phrases, or replacing it with a relative pronoun.

Within the SG framework as he sees it (1980: 182):

> ... while a tactic pattern might be designed so as to allow zero as an option at each nominal-phrase position in a relative clause, it seems impossible ... to prevent the zero option being chosen more (or less) than once in a single clause.

It is certainly to the discredit of proponents of SG that they have never given a detailed account of relative clauses but it seems to the present author that the outline of such an account is clear. Moreover, it presupposes that SG is crucially concerned with modeling the processes of producing and comprehending utterances rather than merely generating sentences. Elsewhere Sampson gives appropriate emphasis to this distinction: compared with 'the "unnatural" task of enumerating all-and-only the well formed sentences' (1980: 178), the 'chief attraction' of SG is its concern with 'how speakers and hearers actually operate' (1980: 177). But at the point at which he doubts SG's ability to provide an adequate characterization of relative clauses he loses sight of his own earlier discussion and is thinking exclusively in terms of generating sentences. As was pointed out in Sect. 1.3, SG assumes not only that a speaker's linguistic system takes the form of a network but also that all of his/her knowledge, both general and specific, is stored in a similar form in a cognitive network. The cognitive network of a particular person contains a vast amount of information about an enormous number of entities, including details of events that they have participated in. Such information represents properties of the entities in question and is utilisable in identifying them. A relative clause incorporating such information is a 'downgraded predication' (Leech 1974: 149–54) from which one participant is omitted, namely the participant that is identified by reference to the remainder of the predication in question. Thus when the structure of the relative clause is produced, the fact that there is one, and only one, gap in it by comparison with an independent sentence is determined by what is being read off from the relevant portion of the speaker's cognitive network.

2.2 Syntax and Lexical Semantics

The studies referred to in Sect. 2.1 were not concerned specifically with lexical semantics and were content therefore to treat lexemes such as *give* and *kill* as realizations of the 'event sememes' 'give' and 'kill.' Yet *give* and *kill* are certainly amenable to lexical decomposition. Moreover, in view of SG's assumption that there is independent patterning at the semantic and surface-syntactic levels, it is natural to formulate the semotactics not in terms of 'give' and 'kill' as such but in terms of the separate components of their meaning. An analogous point can be made particularly clearly in relation to sentences describing a change of position.

Such sentences may contain a 'source expression,' 'path expression,' and 'goal expression':

We drove from York over the Pennines to Manchester. (8)

However, what is involved here is not so much a syntactic classification of prepositional phrases as a semantic distinction which cuts across syntactic categories such as 'preposition' and 'verb.' Admittedly, the goal expression underlying *to Manchester* is realized as a prepositional phrase, but there are goal expressions also in *The first runner is just about to enter the stadium* and *A rabbit has just appeared from behind that tree*, and these are realized not as prepositional phrases but as *enter the stadium* and *appear*, respectively. Similarly, 'means of locomotion' is a semantic category. Particular instances of the category may be realized as verbs, e.g., *drive* in (8), but another possible realization is as the prepositional phrase *by car*.

There should be no duplication of information between the semotactics and lexotactics. Thus, any facts that are deemed to be semantic are thereby excluded from the lexotactics, with the result that the latter is correspondingly simpler. The difference in acceptability of *from behind the door* and **from to the door* depends on the meaning of the prepositions in question. Moreover, it is a straightforward matter to allow the semotactics to produce a sememic representation corresponding to the first of these phrases but not the second. The lexotactics can therefore state merely that one kind of prepositional phrase consists of a preposition followed by a prepositional phrase. It does not need to exclude **from to the door*, since it will never be called upon by the semotactics to produce such a phrase.

Within some approaches to syntax, it has been customary to invoke 'subcategorization features' to reflect the difference in grammaticality between, say, *The journey from Ostende to Vienna was very tiring* and **The fact from Ostende to Vienna was rather unexpected.* Thus, *journey* and *fact* are sometimes subcategorized as follows:

journey: N, +[____ (*from* NP) (*to* NP)]
fact: N, +[____ *that* S]

If, however, the concept 'path' is attributed to *journey* as one of its semantic components, it would follow automatically from the information in the semotactics about source, path, and goal expressions that this noun could be accompanied by prepositional phrases introduced by *from* and *to*, and would not need to be stated as though it were an idiosyncratic syntactic property of the lexeme *journey*.

3. Performance Models

3.1 *Finite-state Node Definitions*

To simulate the production and comprehension processes by sending signals through a network grammar, it is necessary to define the operation of each type of node in such a way that any input signal arriving at a particular type of node along a particular line results in the appropriate output signal. Reich (1969) treated each type of node as a finite-state device. Figure 3(b) is a very preliminary definition of the ordered downward AND node shown in Fig. 3(a). In its initial state—state 0—the node can accept a signal along line *a*, whereupon it sends a signal out along line *b* (hence 'a/b') and switches to state 1. This is equivalent to starting to produce some construction by sending out a signal corresponding to the first constituent. In state 1, the node can accept a signal along line *b*, whereupon it sends a signal out along line *c* and switches into state 2. This is equivalent to receiving a feedback signal to the effect that the first constituent has been produced, which informs the node that it is now time to produce the second constituent. A similar feedback signal up line *c* informs the node that the whole construction is now complete. This information is passed on to whatever node is above the downward AND by sending a signal up line *a*, and at the same time the node switches back to its initial state.

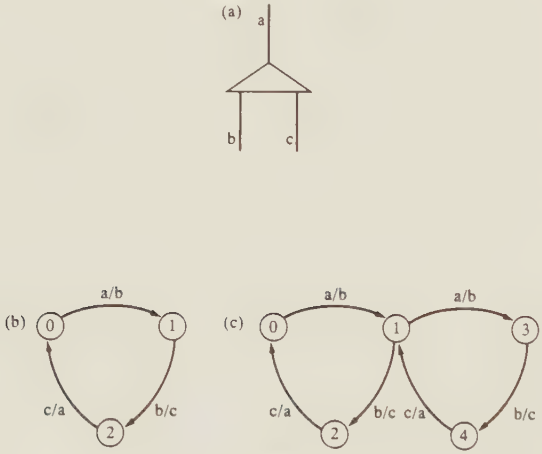


Figure 3.

Given that the sentence construction is one instance of an ordered downward AND, examples such as [*The cat* [*that the dog worried*] *killed the rat*] require an elaboration of the preliminary definition given in Fig. 3(b). To produce an embedded sentence as part of the subject noun phrase of *The cat killed the rat*, the node needs to be able to interrupt the transition from state 1 to state 2 and allow signals to pass through in the sequence a/b, followed by b/c, followed by c/a. This is achieved by adding states 3 and 4 (see Fig. 3(c)). As is seen from the labels on the arrows (a/b, etc.), the state-transitions 0 → 1 → 2 → 0 parallel the transitions 1 → 3 → 4 → 1; but, whereas the former represent an unembedded sentence, the latter correspond to an embedded sentence. The node thus keeps track of where it is in the processing of the matrix and embedded sentences. If speakers were able to produce (and comprehend) an indefinite amount of self-embedding, it would be necessary to add an indefinite number of states to the definition of the ordered downward AND, which would then no longer be a finite-state device. However, three self-embeddings, as in [*The rat* [*that the cat* [*that the dog* [*that the cow tossed*] *worried*] *killed*] *ate the malt*], are already beyond what speakers can process. Thus, the desired amount of self-embedding can be achieved with no more than seven states.

Right-branching and left-branching structures differ in an important respect from self-embedded structures: they may be extended to an arbitrary depth, as is seen from the right-branching structure [*The cow tossed the dog* [*that worried the cat* [*that killed the rat* [*that ate the malt* [*that*.... The crucial fact about such examples is that, as each new sentence is begun, the previous sentence is otherwise complete There are thus no interrupted sentences to which the speaker has to return, for which reason it is unnecessary to keep track of how many sentences one has produced. The structure is therefore 'iterative' rather than 'recursive' (Reich 1969: 839–40). The node definition requires no further states, merely an additional transition (labeled 'a/b') from state 2 to state 1, which allows the node to loop an arbitrary number of times between states 1 and 2. (For more complete discussion of this and other details, see Reich 1969; Schütze & Reich 1990).

The approach outlined above rejects the suggestion that there is a central short-term memory involved in the production and comprehension of syntax. Instead, it claims that short-term memory is spread out over all the nodes of the grammar, since each type of node needs to be able to remember a limited amount of information. It also rejects Chomsky's (1957: 18–25) claim that finite-state grammars are inadequate to describe natural languages. Since there is a sharp cut-off point with regard to recursion proper, and since there is no need to keep track of the amount of iteration, a network grammar containing a finite number of nodes, each of which is a finite-state device, is adequate to the task.

3.2 Spreading Activation

The only aspect of performance considered in Sect. 3.1 was the difference in processing between self-embedding, on the one hand, and right-branching and left-branching, on the other. The signals with which the model operated were either present or absent on a given line at a given time. Later work involving computer simulation of slips of the tongue (Dell & Reich 1980) replaced the earlier on/off signaling by numerical values and allowed a proportion of the signal on a given node to spread to all neighboring nodes. Selection of one or another of a set of competing items then depended on which had the highest level of activation. Among the results obtained in the simulations were that the likelihood of slips was proportional to the similarity between the target word and the influencing word; and the spreading activation mechanism had the effect of editing potential slips that would result in non-words of the language, especially at slower speech rates. Although most of the discussion was concerned with phonology, the same general approach is applicable also in syntax.

3.3 Micronotation

Lamb adopts a different approach to modeling linguistic processes from that of Reich, and one which has much in common with models of neural networks. In place of the nodes and lines of the standard network notation (as of Fig. 1), which allow signaling in either direction, Lamb employs a 'micro-notation' in which nodes and lines carry signals in only one direction. Varying degrees of activation are implemented in terms of frequency of pulsation, and in addition to positive activations there are also inhibitory activations. Nodes have activation thresholds, and lines have varying strengths. (A stronger line carries more activation than a weaker one for the same frequency of pulsation.) Learning in the model consists in building new network structure by bringing latent connections into use.

4. Stratification

Throughout much of the history of SG, the number of strata posited was under continuous review. While the four-stratum model of Fig. 2 enjoyed the most popularity, other versions posited as many as six strata or as few as three. As of the early 1990s, Lamb attaches less importance than before to the distinction among morphemes, lexemes, and sememes, each being a case of lexical units that connect to the conceptual system. The overall architecture of language thus involves a phonological (and graphological) system, a lexical system, and a conceptual system. Alternatively, the conceptual system may be thought of as separate from a more narrowly defined linguistic system, and serving as a bridge between the linguistic system and other mental modalities such as the visual system.

In any case, with the increasing emphasis that is now placed on dynamic aspects of relational networks, the idea of stratification has become less important—with the result that the label 'stratificational grammar' may well have outlived its usefulness. 'Dynamic grammar' has been proposed as a possible alternative label; but, at the time of writing, no clear successor has emerged.

Bibliography

Anderson L B 1978 Stratificational and transformational grammars on 'raising': Comments on Sullivan's paper and a comparison. In: Wang J P (ed.) *Proceedings of the Second Annual Linguistic Metatheory Conference*, 1977. Michigan State University, East Lansing, Michigan

Bennett D C 1975 *Spatial and Temporal Uses of English Prepositions*. Longman, London

Chomsky N 1957 *Syntactic Structures*. Mouton, The Hague

Dell G S, Reich P A 1980 Slips of the tongue: The facts and a stratificational model. In: Copeland J E, Davis P W (eds.) *Papers in Cognitive–Stratificational Linguistics*. Rice University Studies **66**

Hjelmslev L 1961 *Prolegomena to a Theory of Language*. University of Wisconsin Press, Madison, WI (Transl. Whitfield F J)

Lamb S M 1966 *Outline of Stratificational Grammar*. Georgetown University Press, Washington, D.C.

Lamb S M 1987 Linguistics, semiotics, and the human information system. In: *Georgetown University Round Table on Languages and Linguistics, 1986*. Georgetown University Press, Washington, D.C.

Lamb S M in preparation *Toward Outlines of a Cognitive Theory of Language*

Leech G 1974 *Semantics*. Penguin, Harmondsworth

Lockwood D G 1972 *Introduction to Stratificational Linguistics*. Harcourt Brace Jovanovich, New York

Reich P A 1969 The finiteness of natural language. *Language* **45**: 831–43

Sampson G R 1980 *Schools of Linguistics*. Hutchinson, London/Stanford University Press, Stanford, California

Saussure F de 1949 *Cours de linguistique générale*, 4th edn. Payot, Paris

Schütze C T, Reich P A 1990 Language without a central pushdown stack. In: Karlgren H (ed.) *COLING-90: Papers presented to the 13th International Conference on Computational Linguistics on the occasion of the 25th Anni-*

versary of COLING and the 350th Anniversary of Helsinki University. Yliopistopaino, Helsinki, 3: 64–69

Sullivan W J 1978 Raising: A stratificational description and some metatheoretical considerations. In: Wang J P (ed.) *Proceedings of the Second Annual Linguistic Metatheory Conference, 1977*. Michigan State University, East Lansing, Michigan

Sullivan W J 1980 Syntax and linguistic semantics in stratificational theory. In: Moravcsik E A, Wirth J R (eds.) *Current Approaches to Syntax*. Academic Press, New York

---

Evolution of Transformational Grammar

Stephen J. Harlow

Transformational grammar was developed in the mid-1950s by Noam Chomsky. Over the next two decades it became the dominant paradigm in syntactic theory and description and its descendant, government binding theory, is still one of the most influential current theories. Transformational grammar forms a wide-ranging theory, whose central tenets are the use of hypothetico-deductive methodology to construct formal models of certain aspects of human linguistic capabilities. Such models are called ‘grammars’ in the theory and are taken to be an encoding, in some form, of the native speaker’s linguistic knowledge (or ‘competence’). Much of the work of transformational grammar has consisted of constructing models of (fragments of) individual languages, but equally important has been the task of exploring and defining the properties which are required by such grammars to provide accurate and revealing accounts of the linguistic data under consideration. Such general properties are taken to form the content of ‘linguistic theory’ (also termed ‘universal grammar’) and therefore do not need to be stated in individual linguistic descriptions. While a grammar for an individual language is a representation of the linguistic knowledge of the native speaker of that language, linguistic theory represents the properties (possibly very abstract in nature) which constrain all languages and thus defines the notion ‘possible human language.’ The content of universal grammar is taken to be a characterization of the human language acquisition device—those antecedent conditions that make language acquisition possible and which constrain the learning space available to the child acquiring a native language. Transformational grammar has undergone significant evolution since its initial development and one of the slightly ironic consequences of the pursuit of the goals listed above is that transformations themselves have come increasingly to play a less and less significant role in the theory. This article traces that development.

1. Early Transformational Grammar

Transformations, from which the theory derives its name, were developed during the 1950s by Zellig Harris and Noam Chomsky. The central idea underlying the concept of transformation was that of capturing systematic relationships between different syntactic representations. However, because of fundamental differences in the metalinguistic goals of Harris and Chomsky, the role played by transformations in the work of the two and the consequences of their introduction also were radically different.

1.1 Harris on Transformations

For Harris, transformations offered a way of allowing structural linguistics to transcend the limits of the sentence and offer a method of approaching discourse-level structures. For Harris, transformations are a device that extends the descriptive linguistic techniques of segmentation and classification to texts larger than a single sentence. They allow the linguist to establish equivalences between sequences of words in a text which would otherwise resist analysis. For example, suppose that a text contains the sentences:

He played the cello. (1)

The cello was played by Casals. (2)

but no sentences of the form:

Casals played the cello. (3)

The cello was played by him. (4)

In other words, there are no environments which show that *Casals* and *he/him* are grammatically equivalent (i.e., belong to the same grammatical category).

If, however, the text contains active/passive sentence pairs:

He plays the guitar. (5)

The guitar was played by him. (6)

an equivalence can be established between the two sentence types, as follows:

$$N_x V N_y \leftrightarrow N_y \textit{ was } V\textit{ed by } N_x \quad (7)$$

Assuming that *He*, *him*, *Casals*, and *the guitar* belong to the category *N*, and that *played* is a member of the category *V*, (7) captures the relationship between the two; and between all other pairs of sentences possessing the same structure. With the equivalence given in (7) above, 'we can show that all the environments of *Casals* are equivalent to all those of *he*; and this in turn can make other equivalences discoverable textually' (Harris 1952: 129).

1.2 Chomsky on Transformations

For Chomsky, on the other hand, transformations formed part of a program directed at characterizing the nature and properties of the human language faculty. Chomsky states:

> The development of these ideas that I would like to report on briefly, however, follows a somewhat different course. It begins by questioning the adequacy of a certain view of the nature of linguistic theory that has dominated much recent work, and it attempts to reformulate the goals of linguistic theory in such a way that questions of a rather different nature are raised. And finally, it attempts to show that the concept of grammatical transformation, in something like Harris' sense, but with certain differences, is essential to answering these questions.
>
> (Chomsky 1964b: 212)

One major difference between Chomsky's and Harris's applications of transformations was the nature of the representations between which a transformational mapping held. For Harris, the kinds of relationships captured by transformations were essentially those which in terminology developed later were called 'surface structure' relationships (Chomsky 1965a). That is to say, the mappings defined by transformations were limited to those which could be expressed in terms of the categories and linear order of the actually occurring words/morphemes in a sentence. For Chomsky, no such restriction was applicable. This is apparent in one of Chomsky's earliest and most well-known transformational analyses: that of the English auxiliary system. The abstractness permitted by Chomsky's conception of transformations allowed him to propose an elegant and simple analysis of the auxiliary system which, in the words of Newmeyer (1980: 24), '[...] probably did more to win supporters for Chomsky than all of his metatheoretical statements about discovery and evaluation procedures.' In *Syntactic Structures*, the book in which transformational grammar first became accessible to the linguistic community, Chomsky states:

> The study of these 'auxiliary verbs' turns out to be quite crucial in the development of English grammar. We shall see that their behaviour is very regular and quite simply describable when observed from a point of view that is quite different to that developed above. Though it appears to be quite complex if we attempt to incorporate these phrases directly into a [S, F] grammar [i.e. a phrase structure grammar].
>
> (Chomsky 1957: 38)

and proposes the following phrase structure rules:

(i) $\mathit{Verb} \rightarrow \mathit{Aux} \rightarrow V$ [28]
(ii) $V \rightarrow$ *hit, take, walk, read, etc.*
(iii) $\mathit{Aux} \rightarrow C\ (M)\ (\mathit{have}+\mathit{en})\ (\mathit{be}+\mathit{ing})\ (\mathit{be}+\mathit{en})$
(iv) $M \rightarrow$ *will, can, may, shall, must*

$$\text{(i)}\ C \rightarrow \begin{Bmatrix} S \text{ in the context } NP_{sing} \\ \text{Ø in the context } NP_{pl} \\ \mathit{past} \end{Bmatrix} \qquad [29]$$

Rule [28iii] states that an *Aux* phrase must contain as its initial element the tense/agreement morpheme *C*, and that this initial element can be followed by zero or more of *M*, *have* + *en*, *be* + *ing*, *be* + *en* in that order. *M* can then take any of the forms in [28iv]. Chomsky (1975: 232–33) observes, however, that:

> the seqence of morphemes which results from an application of [28] is not in the correct order. Thus to complete the statement we give the following rule [which later became known as 'affix hopping']:
>
> (ii) Let *Af* stand for any of the affixes *past*, *S*, *Ø*, *en*, *ing*. [29]
> Let *v* stand for any *M* or *V*, or *have* or *be* (i.e., for any nonaffix in the phrase *Verb*). Then:
>
> $\mathit{Af}+v \rightarrow v+\mathit{Af}\#$
>
> where # is interpreted as word boundary.
>
> (iii) Replace + by # except in the context $v \rightarrow \mathit{Af}$.
> Insert # initially and finally.

When the items *S*, *have* + *en* and *be* + *ing* in rule [28iii] are selected to give the string:

the + *man* + *S* + *have* + *en* + *be* + *ing* + *read* + *the* + *book* (8)

and rule [29ii] is applied three times (first to *C* + *have*, then to *en* + *be*, and finally to *ing* + *read*), followed by the application of rule [29iii], the following is derived:

the # *man* # *have* + *S* # *be* + *en* # *read* + *ing* # *the* # *book* (9)

Chomsky's analysis thus depends upon an abstract structure in which the affixes of the auxiliary system do not appear in their 'surface' order. The question of what kind of syntactic representations could legitimately constitute the input and output of a transformation came to be one of the most significant issues in the development of transformational theory.

In Chomsky's interpretation of the notion, a transformation is a mapping which converts a sentence (= a string of words) with an associated constituent structure analysis (= a 'phrase marker'), defined by a set of phrase-structure rules, into a new sentence with a 'derived constituent structure.' A transformation consists of a 'structural analysis' (often also called a 'structural description,' and abbreviated to *SD*), which specifies the sequence of categories into which a phrase marker must be analyzable for the transformation to apply to it, and a 'structural change,' which specifies the changes effected on the input phrase marker by the transformation. For example, the passive transformation is given by Chomsky (1957: 112) in the following form:

Structural analysis: (10)
$NP - Aux - V - NP$
Structural change:
$X_1 - X_2 - X_3 - X_4 \rightarrow X_4 - X_2 + be + en - X_3 - by + X_1$

(An alternative notation, which merges the structural analysis and structural change into a single statement of the form:

$$NP_1 - Aux - V - NP_2$$
$$\rightarrow NP_2 - Aux + be + en - V - by + NP_1$$

was also commonly used in later transformational work.)

The structural analysis specifies that for the transformation to apply to a string, the phrase marker associated with that string must be analyzable into a sequence of *NP–Aux–V–NP*. In the structural change, the variables X_1–X_4 identify the four categories listed in the structural analysis and the string to the right of the arrow defines the mapping effected by the transformation: the relative positions of the two NPs are interchanged, the morpheme *by* is adjoined to the left of X_1 in its new position and the morphemes *be* and *en* are adjoined to the left of X_2 (= *Aux*). Each transformation is thus the composition of a number of more elementary operations, which include deletion, substitution of one element for another, adjunction, and permutation. For example, Chomsky (1965b: 120) specifies the operation of the passive transformation in terms of the following 'elementary transformation,' which details the operations performed by the rule:

tp(Y_1; $Y_1, \ldots, Y_4$) = Y_4 (11)
[substitute Y_4 for Y_1]
tp(Y_1, Y_2; Y_2, Y_3, Y_4) = Y_2^be^en
[adjoin *be* and *en* to the right of Y_2]
tp(Y_1, Y_2, Y_3; Y_3, Y_4) – Y_3
[leave Y_3 unchanged (identity)]
tp(Y_1, Y_2, Y_3, Y_4; Y_4) = bê Y_1
[adjoin *be* to left of Y_1]
tp($Y_1, \ldots, Y_n$; $Y_n, \ldots, Y_r$) = Y_n for all $n \leqslant r \neq 4$
[identity]

This notation identifies each term in the structural description of the transformation by successively splitting the structural description into two substrings (indicated in (11) by the semicolon), one of which terminates with that item and the other of which begins with it. For each such item, the elementary transformation specifies what operation is performed on it.

As stated above, Chomsky's motivation for the introduction of transformations was radically different from that of Harris. Chomsky had established a hierarchy of language types, which could be used to model the properties of human languages. Each of the languages on the Chomsky hierarchy is defined in terms of the possible sequences of symbols it admits. Chomsky presented a proof that English possesses properties which mean that it cannot be analyzed in terms of the most restricted type of language on the hierarchy: 'finite state languages.' He also argued that any attempt to describe the syntactic properties of English in terms of the kind of devices available for characterizing the next weakest language type on the hierarchy ('phrase structure languages') leads to the loss of generalizations and greater complexity. The simple and elegant analysis of the English auxiliary system or of the passive outlined above, for instance, which require the capacity to rearrange the order of elements in a string cannot be accomplished within the limits of these more restricted grammatical systems. Chomsky concludes (1957: 44) 'By further study of the limitations of phrase structure grammars with respect to English we can show quite conclusively that these grammars will be so hopelessly complex that they will be without interest unless we incorporate such rules [i.e., transformations].' (It is, however, important to note that Chomsky did not *prove* that English could not be analyzed by phrase structure grammars at all. Rather, he argued that any such analysis would be unacceptably complex and unrevealing. Indeed, later developments in phrase structure grammars in the 1980s demonstrated that even this assertion is too strong.)

A grammar for Chomsky is a device which defines the language under investigation via a system of rules. In the earliest stages of transformational grammar (e.g., *Syntactic Structures*), the grammar consisted of three sets of rules:

Phrase structure rules (12)
Transformations
Morphophonemic rules

As seen above, the phrase structure rules defined the constituent structures which form the input to the transformational component. The morphophonemic rules are responsible for ensuring, for example, that *take* + *en* is realized as *took*.

1.3 Subtypes of Transformations

Transformations in the early period fell into two categories, 'singulary' transformations, whose domain consisted of a single sentence, and 'generalized' (or 'double-based') transformations, with a structural description containing reference to more than one sentence. All the examples mentioned so far have been of singulary transformations. An example of a generalized transformation is the rule for coordination (Chomsky 1957: 113):

Structural analysis: of S_1: $Z - X - W$ (13)
of S_2: $Z - X - W$

where X is a minimal element (e.g., *NP*, *VP*, etc.) and Z, W are segments of terminal strings.

Structural change:
$(X_1 - X_2 - X_3; X_4 - X_5 - X_6) \rightarrow (X_1 - X_2 + \mathit{and} + X_5 - X_6)$

For example:

(Yesterday – John – left home; Yesterday – Sam – left home) → (Yesterday – John – and + Sam – left home), where *John* and *Sam* are both instances of NP.

A further major class of generalized transformations were those that embedded one sentence in another. Chomsky (1964b) lists 19 such transformations, of which the following are representative examples:

Nominalization (14)

Structural analysis: S_1: $T, it+\varphi, VP$
S_2: NP, C, VP_1

Structural change:
$X_4 + S$ or φ replaces X_1; $ing + X_6$ replaces X_2

For example:

$$\left\{\begin{array}{lll} T & -it+C & -\text{be}+\text{a}+\text{great}+\text{surprise} \\ X1 & X2 & X3 \\ \text{John} & -\text{C} & -\text{prove}+\text{the}+\text{theorem} \\ X4 & X5 & X6 \end{array}\right\}$$

→John + S – ing + prove + the + theorem – C – be + a + great + surprise

giving 'John's proving the theorem was/is a great surprise.'

Complement (15)

Structural analysis: S_1: $X, V_T, Comp, NP$
S_2: $NP, Aux, be, Pred$

Condition: X_2 is a member of the class of verbs containing *consider*, *believe*. . . .

Structural change: X_5 replaces X_4; X_8 replaces X_3

For example:

$$\left\{\begin{array}{llll} \text{They}+\text{C} & -\text{consider} & -\text{Comp} & -\text{the}+\text{assistant} \\ X_1 & X_2 & X_3 & X_4 \\ \text{the}+\text{assistant} & -\text{C} & -\text{be} & -\text{qualified} \\ X_5 & X_6 & X_7 & X_8 \end{array}\right\}$$

→ They + C – consider – qualified – the + assistant

Following the application of an obligatory transformation which permutes the last two factors in the derived phrase marker, this gives *They consider the assistant qualified.*

This class of generalized transformation exemplified by (15) formed the locus of recursion in early transformational grammar, and was thus the mechanism by which grammars make available an infinite set of sentences from finite resources.

1.4 Rule Ordering

Transformations, in principle, could be ordered arbitrarily relative to one another (i.e., they were extrinsically, rather than intrinsically ordered). For example, the derivation of an interrogative sentence such as *Did John eat an apple* involved the application of the (optional) question-formation transformation:

Structural analysis: $\left\{\begin{array}{l} NP-C-V\ldots \\ NP-C+M-\ldots \\ NP-C+have-\ldots \\ NP-C+be-\ldots \end{array}\right\}$ (16)

Structural change: $X_1 - X_2 - X_3 \rightarrow X_2 - X_1 - X_3$

In other words, the tense formative *C* moves to the front of the sentence. The resulting derived P-marker requires the obligatory application of the word-boundary transformation [29iii] and the *do*-insertion transformation:

do-insertion (17)

Structural analysis: $\# - Af$

Structural change: $X_1 - X_2 \rightarrow X_1 - do + X_2$

(Adjoin the word *do* to the left of any affix immediately preceded by a word boundary.)

The successive stages of the derivation would look like this:

Phrase structure: John – C – eat – the apple
Question-formation: C – John – eat – the apple
Word-boundary: # C # John # eat # the apple
Do-insertion: # do + C # John # eat # the apple

(*do* + *C* is then converted to *did* by a morphophonological rule).

In order to correctly derive the sentence *Who ate the apple*, it was necessary to stipulate that T_w, the rule which moves an interrogative element such as *who* to sentence initial position, must apply *after* the question-formation transformation:

Phrase structure rules: John – C – eat – the apple
Question-formation: C – John – eat – the apple
T_w: Who – C – eat – the apple
Word-boundary: # Who # C eat # the apple

Do-insertion cannot apply to this structure, so 'affix hopping' [29ii] applies obligatorily instead:

Affix Hopping: # Who # eat + C # the apple

Applying the two transformations in the reverse order would have the following effect:

Phrase structure rules: John – C – eat – the apple
T_w: Who – C – eat – the apple
Question-formation: C – who – eat – the apple
Word-boundary: # C # who # eat # the apple
Do-insertion: # do + C # who # eat # the apple

This would give the ungrammatical **Did/does who eat the apple*. The only way in this analysis to avoid the generation of this ungrammatical string is to stipulate the ordering which gives the correct results.

In addition, a stipulation was required as to whether the application of a given transformation was either obligatory or optional. In the examples given above, the passive transformation is an instance of an optional rule, 'affix hopping,' [29ii] an instance of an obligatory rule—it must apply to any structure which meets the terms of its structural analysis. A sentence that is generated solely by the application of obligatory rules was termed a 'kernel' sentence. These corresponded to the class of simple, active, declarative sentences. Associated with the transformational derivation of each sentence was a representation called a 'T-marker,' which recorded which transformations had applied and in which order.

1.5 Transformations and Mental Processes

Although transformational grammar is intended as a model of the linguistic knowledge of the native speaker, it was not Chomsky's claim that the components of the theory were a model of the way the construction or comprehension of linguistic utterances is computed in the brain. Nonetheless, a number of experiments carried out in the 1950s and 1960s seemed to show that the transformational grammars developed for English during the early period did indeed make accurate predictions if taken as models of mental processing. In brief, these experiments seemed to show that there was a correlation between the number of transformations involved in the derivation of a sentence and the processing complexity associated with the sentence, measured in terms of some behavioral index such as response time—the greater the number of transformations involved, the greater the processing difficulty. For example, passive sentences take longer to process than their active counterparts and negative sentences take longer to process than their affirmative counterparts.

However, subsequent studies and a more mature assessment of the results of these experiments have shown that those experiments which seemed to show a positive correlation between transformational complexity and processing load did so because of a failure to control for other variables. It is well attested that processing load increases with sentence length. In the case of passive sentences, for example, *Albert was eaten by a lion* is two words longer than *A lion ate Albert*. Once such factors as this were controlled for, it became apparent that the derivational complexity hypothesis could not be maintained. It is universally agreed that the relationship between the form of a transformational grammar and the manner in which it is implemented in the brain is much more abstract and indirect than these early experiments suggested. It is therefore important to note that when linguists talk of a grammar 'generating' a set of sentences, there is no implication in the use of the term that the grammar is a model of human sentence production (see Carroll & Bever 1976).

2. The 'Standard Theory'

As Chomsky comments (1975: 23), 'The theory of transformations developed in *The Logical Structure of Linguistic Theory* was far too unrestricted. It seems that there are much narrower conditions that determine the applicability of transformations and the kinds of mapping that they can perform.' The subsequent development of transformational grammar can be seen as a progressive transfer of many of the functions originally assigned to transformations to other components of the grammar.

There are five major areas in which this pattern of development can be seen:

1. rule interaction;
2. recursion;
3. derived constituent structure;
4. the relationship of syntax to semantic interpretation;
5. the degree of abstractness permitted for underlying representations.

Rule interaction had presented a problem in the early theory of transformations because it was not clear what kind of ordering relationships could exist between singulary and generalized transformations. It was not clear whether, for example, singulary transformations could apply to an incomplete sentence structure *before* a generalized transformation embedded material in it. Various suggestions were made concerning the 'traffic rule' problem, but the most significant contribution was that of Fillmore (1963) who observed that it did not appear that there were any cases in which a singulary transformation had to apply to a structure before a generalized transformation embedded material in it. Second, it did not appear that it was necessary in practice to stipulate any ordering between generalized transformations, and third, there were attested cases where a singulary transformation could apply to a sentence before it was embedded in a larger structure (passive, for example, in sentences such as *The director believed the keeper to have been eaten by one of the lions*). Fillmore's conclusion from these facts was that singulary transformations should apply first to (what would be) the most deeply embedded sentence. This sentence would then be embedded in the matrix sentence by a generalized transformation. This sentence would then become the domain of the singulary transformations again, and the process would be repeated as often as necessary.

Since transformations are mappings from phrase markers to phrase markers, it is essential that there be some well-defined way of specifying the constituent structure that results from the application of a transformation. The passive, for example, requires that the word *by* be adjoined to the left of the NP which has been moved into final position. It is clear that the resulting constituent should be a prepositional phrase, and that *by* itself should be a preposition. This information is not derivable, however, from the version of the transformation given above. Some linguists resolved this issue by specifying the details of the derived constituent structure in the structural change of the transformation itself:

$$NP_1 - Aux - V - NP_2 \rightarrow NP_2 - Aux + be + en - V - [_{PP}[_{P} by] + NP_1] \tag{18}$$

This increasingly came to be considered an undesirable enrichment of the theory and alternatives were sought.

The problem of derived constituent structure also arose in the context of the application of generalized transformations. As can be seen from the complement example above (15), the transformation not only embeds material from one clause into another, but also deletes the subject of the embedded clause. The question then arises as to what the category of the embedded constituent is. The idea rapidly developed (Katz & Postal 1964) that clauses into which a sentence was to be embedded should contain a 'dummy' node, defined by the phrase structure component of the grammar, which would provide a host (and a category) for the embedded material.

These issues were addressed in the 'standard theory,' the name given to the revised version of transformational grammar developed by Chomsky in his book *Aspects of the Theory of Syntax* (1965a).

2.1 Rule Interaction: The Transformational Cycle

In *Aspects* the issues listed above received a radical answer, which reduced the role which transformations played in the theory. Most dramatically, the class of generalized transformations was eliminated entirely and their role as the locus of recursion was allocated to the phrase structure component. The issue of rule interaction was resolved by combining Fillmore's proposals with this innovation. Their joint effect is to require that transformations apply first to the most deeply embedded sentential structure, and, only when all possibilities have been exhausted, is the next 'higher' sentential level considered as a transformational domain. Graphically, the situation is illustrated in the schematic tree in Fig. 1:

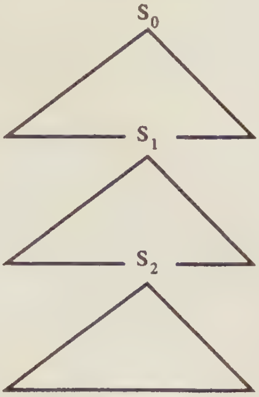


Figure 1.

All transformations apply first to S_2, then to S_1, and only then to S_0. This principle of transformational rule application is known as the ('transformational') cycle.

By way of specific illustration, take the analyses of complementation by Rosenbaum (1967) whose thesis has proved a reference point for most subsequent work. Rosenbaum's work is concerned with the analysis of sentences such as the following:

Sam prefers to stay here. (19)

I believe Bill to have been convinced by John. (20)

John is believed by me to have convinced Bill. (21)

Each of these sentences would earlier have involved a generalized transformation. In the *Aspects* framework, the structures underlying them are provided by the following phrase structure rule:

$$VP \rightarrow V \quad (NP) \quad S \tag{22}$$

This rule pre-empts the role of generalized transformations by introducing the symbol S on its right-hand side. The structure associated with (19) by Rosenbaum's phrase structure rules (suppressing some details) is given in Fig. 2.

On the lowest cyclic domain (the structure dominated by S_1) no rules apply. When the next highest cyclic domain (S_0) is reached, a 'complementizer placement' transformation is responsible for transforming this basic structure into:

Second Cycle: Sam prefers [for Sam [$_{VP}$ to stay here]]

This structure meets the structural description of what Rosenbaum termed the 'identity erasure transformation' (now generally known as 'equi NP deletion,' or simply 'Equi'):

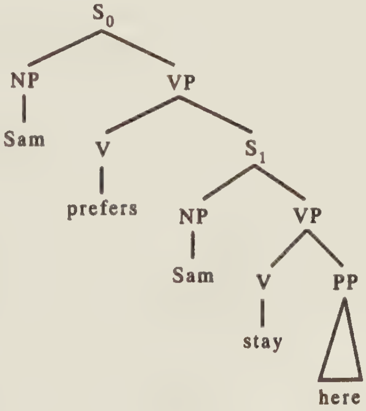


Figure 2.

Equi NP Deletion (23)

Structural Description:

W	(NP)	X	+D	NP	Y	(NP)	Z
1	2	3	4	5	6	7	8

(Where + D identifies the complementizer *for – to*.)

Structural Change: 5 is erased (deleted) by 2

The effect of the application of this rule on *Sam prefers* [*for Sam* $[_{VP}$ *to stay here*]] is to delete the second occurrence of the NP *Sam*:

Second Cycle: Sam prefers [for $[_{VP}$ to stay here]]

which finally gives *Sam prefers* [$_{VP}$ *to stay here*]], through the application of a rule of 'complementizer deletion.'

For (20) and (21), Rosenbaum's analysis would provide the derivations in (20a) and (21a). (Note the use of the substructure $[_{MAN}$ by + P] in these derivations to provide a trigger for the passive transformation and a landing-site for the NP moved from subject position by the passive.)

(20a)

First Cycle:	I believe $[_{NP}$ it $[_{S}$ $[_{NP}$ John] $[_{VP}$ have + en convince Bill] $[_{MAN}$ by + P]]]]
Passive:	I believe $[_{NP}$ it $[_{S}$ $[_{NP}$ Bill] $[_{VP}$ have + en *be + en* convince $[_{MAN}$ by + *John*]]]]
Affix Hopping:	I believe $[_{NP}$ it $[_{S}$ $[_{NP}$ Bill] $[_{VP}$ have *be + en convince + en*] $[_{MAN}$ by + John]]]]
Second Cycle:	
Complementizer Placement:	I believe $[_{NP}$ it $[_{S}$ *for* $[_{NP}$ Bill] $[_{VP}$ *to* have be + en convince + en] $[_{MA}{}^{N}$ by + John]]]]
Extraposition:	I believe $[_{NP}$ it] $[_{S}$ for $[_{NP}$ Bill] $[_{VP}$ to have be + en convince + en] $[_{MAN}$ by + John]]]
Raising to object:	I believe $[_{NP}$ *Bill*] $[_{S}$ for $[_{VP}$ to have be + en convince + en] $[_{MAN}$ by + John]]]
Complementizer Deletion:	I believe $[_{NP}$ Bill] $[_{S}$ $[_{VP}$ to have be + en convince + en] $[_{MAN}$ by + John]]]
Post Cycle:	
Morphophonemic Rules:	I believe $[_{NP}$ Bill] $[_{S}$ $[_{VP}$ to have *been convinced*] $[_{MAN}$ by + John]]]

('Extraposition' is a transformation that takes a structure of the form $[_{NP}$ it S] and moves the S rightwards out of the NP.)

(21a)

First Cycle:	I believe $[_{NP}$ it $[_{S}$ $[_{NP}$ John] $[_{NP}$ have + en convince Bill]]] $[_{MAN}$ by + P]
Affix Hopping:	I believe $[_{NP}$ it $[_{S}$ $[_{NP}$ John] $[_{VP}$ have *convince + en* Bill]]] $[_{MAN}$ by + P]
Second Cycle:	
Complementizer Placement:	I believe $[_{NP}$ it $[_{S}$ *for* $[_{NP}$ John] $[_{VP}$ *to* have convince + en Bill]]] $[_{MAN}$ by + P]
Passive:	$[_{NP}$ it $[_{S}$ for $[_{NP}$ John] $[_{VP}$ to have convince + en Bill]]] *be + en* believe $[_{MAN}$ by + I]
Extraposition:	it be + en believe $[_{MAN}$ by + I] $[_{S}$ for $[_{NP}$ John] $[_{VP}$ to have convince + en Bill]]]
Raising:	*John* be + en believe $[_{MAN}$ by + I] $[_{S}$ for $[_{VP}$ to have convince + en Bill]]]
Affix Hopping:	John be *believe + en* $[_{MAN}$ by + I] $[_{S}$ for $[_{VP}$ to have convince + en Bill]]]
Complementizer Deletion:	John be believe + en $[_{MAN}$ by + I] $[_{S}$ $[_{VP}$ to have convince + en Bill]]]
Post Cycle:	
Morphophonemic Rules:	John is *believed* $[_{MAN}$ by + *me*] $[_{S}$ $[_{VP}$ to have *convinced* Bill]]]

In (20a) the passive transformation applies on the first cycle (inside the subordinate clause), whereas in (21a) it applies on the second cycle (in the main clause). In both derivations affix hopping applies twice, once on the first cycle and once on the second. Both these sentences also exemplify the rule of raising (called 'pronoun replacement' by Rosenbaum), which moves the subject of a non-finite subordinate clause (here *John*) into the next higher clause on the second cycle. The existence of this rule was to become a major issue in the subsequent development of transformational grammar.

2.2 The Organization of the Grammar

With the adoption of the transformational cycle, many of the problems of rule interaction were satisfactorily resolved and, by the time of the publication of *Aspects of the Theory of Syntax*, the organization of the grammar took the following form (shown in Fig. 3).

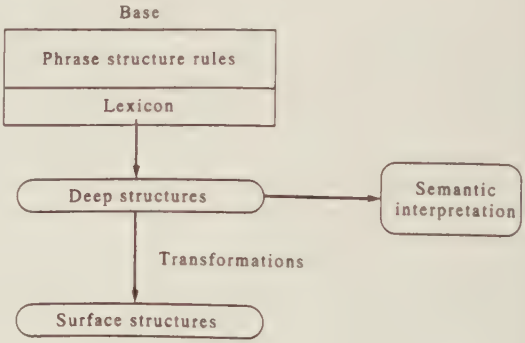


Figure 3.

The 'lexicon' (formerly part of the phrase structure component) and Phrase Structure Rules were split into separate subcomponents of the 'base component' of the grammar and jointly determined a level of syntactic representation called 'deep structure.' This, on the one hand, provided the input to rules of semantic interpretation and, on the other, the input to the transformational component of the grammar, which mapped deep structure representations on to surface structure representations in the manner illustrated in (20a) and (21a) above.

3. Generative Semantics

The proposal that deep structure formed the level at which both lexical insertion and semantic interpret-

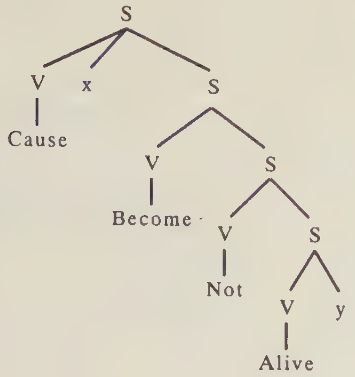


Figure 4.

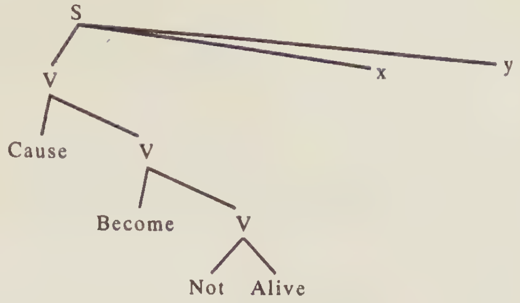


Figure 5.

ation took place came under strong challenge during the late 1960s. The branch of transformational grammar which became known as generative semantics argued that this conception of the organization of the grammar led to a loss of generalizations, a situation which could be remedied if underlying representations were allowed to be more abstract than Chomsky's deep structures (see *Generative Semantics*). This aspect of generative semantics was driven by the Katz–Postal hypothesis (Katz & Postal 1964) concerning the relationship between syntax and semantics. This proposed that all the information necessary for semantic interpretation is represented in the underlying structure of a sentence. Corollaries of this proposal are that synonymous sentences have a single underlying structure and that ambiguous sentences have more than one underlying structure. It also implies that transformations do not change semantic interpretation.

For many sentence pairs, such as actives and passives, this proposal seems eminently reasonable. The assumption that *John saw Bill* and *Bill was seen by John* have the same deep structure and acquire their different surface forms through the application of transformations provides a basis for accounting for the fact that the two sentences have the same truth conditions. However, this logic, when applied to *Bill is dead* and *Bill is not alive* leads to the conclusion that they too must share a single underlying structure. In this case, however, such an identity in underlying structure must exist *before* lexical insertion, contradicting Chomsky's hypothesis about deep structure. This led McCawley (1968) to propose that the underlying structure of a sentence of the form *x killed y* should receive the analysis in Fig. 4 (note that McCawley is assuming here that in its underlying structure English is verb-initial; see McCawley 1970 for details).

By the repeated cyclic application of an optional transformation of 'predicate raising,' the verbs in this structure could be adjoined to one another to give the structure in Fig. 5.

McCawley proposed that 'if lexical insertion did not apply until after that transformation, then the "dictionary entry" for *kill* could be expressed as a transformation which replaces the subtree at the left [of the above tree] by *kill*' (McCawley 1968: 73). If lexical insertion is constrained to apply before all transformations, as in the *Aspects* approach, the semantic relationship between *x killed y* and *x caused y to become not alive* could not be expressed using transformations.

As an example of ambiguity prompting the postulation of different underlying structures, where purely syntactic evidence might not warrant them, take Lakoff's (1970) argument that the ambiguity of the sentence (24), with its two paraphrases (25) and (26):

I don't beat my wife because I like her. (24)

It is because I like her that I don't beat my wife. (25)

It is not because I like her that I beat my wife. (26)

could be accounted for by the assumption that the two readings correspond to different underlying structures. For (25), Lakoff proposed the structure in Fig. 6. For (26), he proposed the structure in Fig. 7. Transformations called 'it-deletion' and 'neg lowering' apply to these structures to give (24).

A further modification of standard transformational grammar made within generative semantics concerned the nature of the relationship which held between the various levels of a derivation. In standard transformational grammar, transformations are in effect relations between adjacent stages in a derivation. There was no possibility of a transformational 'looking forward' to a future stage in the derivation, for example. Generative semanticists, on the other hand, argued that such extensions were necessary. Lakoff (1971) observed that sentences like *Many men*

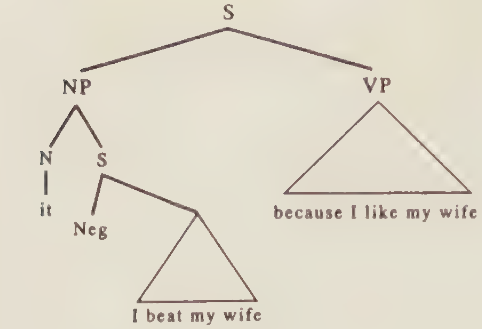


Figure 6.

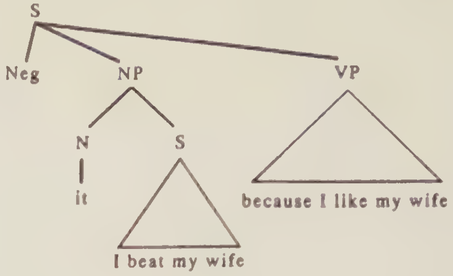


Figure 7.

read few books and *Few books are read by many men* seem to differ in their interpretations. The first is paraphrasable as *There are many men who read few books* and the second as *There are few books that are read by many men.* Lakoff proposed that these two interpretations are derived from different underlying structures. The first has the underlying structure in Fig. 8, the second that in Fig. 9.

The surface structures are derived by a transformation of 'quantifier lowering.' A problem remains, however, in ensuring that structure in Fig. 8 must undergo passive and the structure in Fig. 9 must not. Lakoff's solution was to propose that passive and quantifier lowering could freely apply to both structures, but that a 'global derivational constraint' checked the relationship between the underlying and surface forms, requiring that the quantifier which was highest in underlying structure must be the leftmost one in surface structure. Global constraints allow the application of a transformation to have access to any level of representation in the derivation, not merely the information coded in its structural description and structural change.

In essence, what generative semantics did was to pursue the use of transformations to express linguistic regularities and subregularities to its logical conclusion. It assumed that transformations were the *only* way that such regularities should be captured, incorporating into syntactic description phenomena from semantics, pragmatics, and even social interaction. Ultimately, however, this central tenet of generative semantics was rejected by the majority of linguists working in the transformational framework. (A more comprehensive discussion of generative semantics and the factors both linguistic and nonlinguistic involved

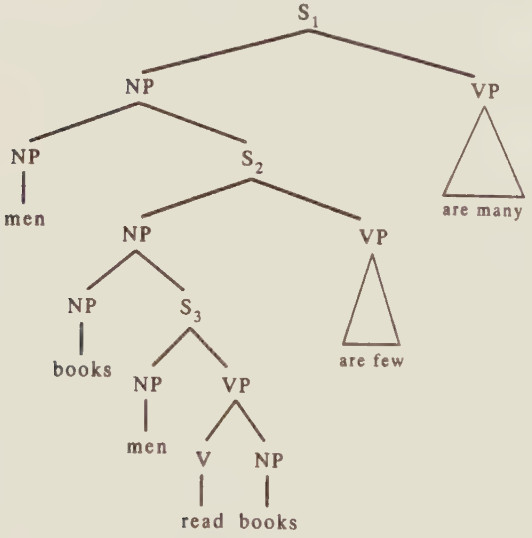


Figure 8.

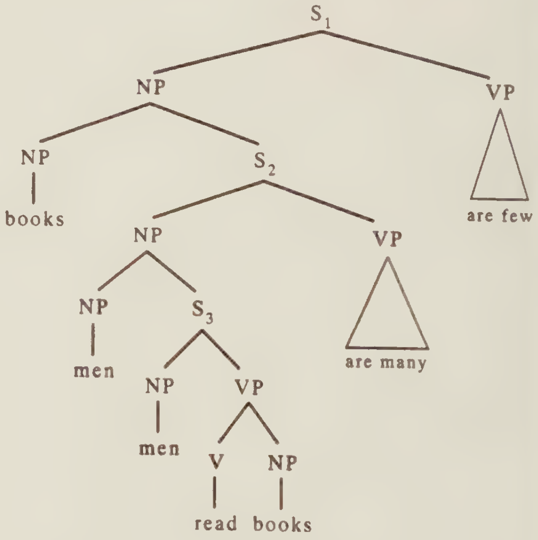


Figure 9.

in its rise and fall can be found in Newmeyer 1980: ch. 4 and 5.)

4. The Extended Standard Theory

Subsequent developments in transformational grammar were motivated by a desire to constrain the expressive power of the transformational component. These took two forms. One was to seek to impose restrictions on transformations themselves, with the goal of limiting their expressive power; the other was to reallocate the responsibility for certain classes of phenomena to other components of the grammar, in particular the lexicon, the phrase structure component, and the semantic component. The name given to the version of the theory incorporating these revisions, which developed during the 1970s, was the 'extended standard theory.'

The work of Peters & Ritchie (1973) too undoubtedly encouraged a climate in which constraining the power of transformations was seen as desirable. They provided a proof that transformational grammars of the *Aspects* type had the weak generative capacity of the most powerful device on the Chomsky hierarchy, unrestricted rewriting systems (Turing machines). This meant that human languages, as characterizable by transformational grammars, had no particular properties other than that they could be generated by some set of well-defined rules. *Aspects*-style transformational grammar did not place any interesting constraints on the class of possible human languages. In terms of language acquisition, this implies that the formal properties of transformational grammars provided no interesting restrictions on the search space accessible to the learner. There was undoubted merit, in the light of these results, in any program which sought to constrain the power of existing transformational grammars.

4.1 The Lexicalist Hypothesis

'Nominalization,' referred to above, had been one of the earliest transformational rules proposed (see Lees 1966). Yet in 'Remarks on nominalization', Chomsky (1970) developed the argument that at least some nominals which had previously been assumed to be transformationally derived were in fact simply basic lexical entries. His argument had two prongs. First, he demonstrated that the basis for the purported generalization was unsound and, second, that there were alternative ways of capturing the generalizations which remained.

In arguing against a transformational analysis of nominalization, Chomsky noted that what he termed 'derived nominals' (such as *refusal*, *easiness*, *revolution*, *belief*) do not occur in structures which are themselves derived by transformations. (The term 'derived nominal' does not imply any transformational derivation. Rather, the term is an allusion to the fact that such nominals form part of the derivational morphology of English.) So the sentences on the right of the arrows in (27) and (29) below are well-formed, but their corresponding derived nominals in (28) and (30) are not:

To please John is easy ⇒ John is easy to please (27)

*John's easiness to please (28)

For John to win the prize is certain ⇒ John is certain to win the prize (29)

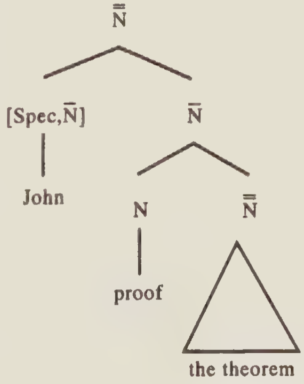
*John's certainty to win the prize (30)

Furthermore, the semantic relationship which holds between a derived nominal and the item it is supposed to be derived from is frequently idiosyncratic. *John's deeds*, for example, are not the same as *things which John did*, nor is *John's ignorance* the same as *what John ignores*. In the common situation where there is no verb or adjective corresponding to a derived nominal (such as *'book,' 'poem'*), the proponent of a transformational analysis is forced to postulate abstract underlying verbs such as *poetize* and to formulate mechanisms to ensure that these nonexistent items do not show up in surface structures (see, for example, Lakoff 1970).

To capture the regularities that do occur, such as *John refused to leave*/*John's refusal to leave*, *The enemy destroyed the city*/*The enemy's destruction of the city* and *The city was destroyed by the enemy*/*The city's destruction by the enemy*, Chomsky proposed first that in cases where there exists a verb/derived nominal pair, the lexical entry should be neutral with respect to grammatical category, but should specify what complements the pair require. In addition, he proposed an extension of the theory of phrase structure, known as 'X-bar theory,' to allow generalizations to be made across different linguistic categories.

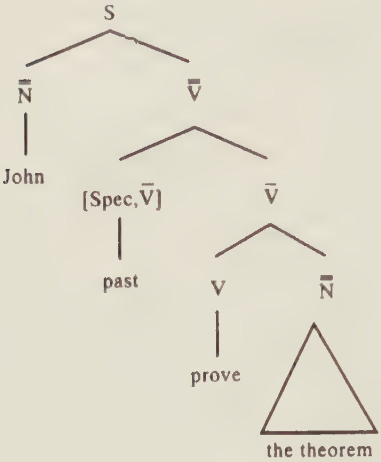
For example, sentences and NPs have a similar internal structure (cf. Chomsky 1970: 211). In (31) *the theorem* is the direct object of the noun *proof* and *John* is its subject. (This structure also requires the later insertion of the preposition *of*.)

(31)



In the corresponding sentence, *the theorem* and *John* hold exactly the same grammatical relations to the verb *prove*.

(32)



Chomsky also proposed that cyclic transformations such as passive could apply not only within sentences, but also within NPs, and proposed factoring the passive transformation into two subrules: 'NP-preposing' and 'agent-postposing.' The derivation of *The city's destruction by the enemy* would look like this (with various details omitted):

(33)

	The enemy('s) destruction the city by Δ
Agent-postposing	The destruction (of) the city by the enemy
NP-preposing	The city('s) destruction by the enemy

Note that the intermediate stage, resulting from agent-postposing, is also grammatical, provided that the NP's subject position is filled by a determiner. Exactly the same transformations apply in the case of the sentential passive *The city was destroyed by the enemy*, with the additional proviso that, for independent reasons, NP-preposing is obligatory.

Chomsky's argument, then, was that the generalizations captured by the nominalization transformation were spurious and, to the extent that genuine generalizations exist (such as the existence of active/passive pairs of nominalizations) there are alternative analyses available. The upshot of this was the proposal that transformations cannot change the syntactic category of an item. Thus, the rule of nominalization, as posited in early transformational grammar is not a possible transformation. This proposal was termed the 'lexicalist hypothesis,' because it assumes that any relationship of a cross-categorical kind is represented in the lexicon, and not by a transformational relationship.

4.2 Interpretive Semantics

The lexicalist hypothesis removes from the transformational component the power to alter syntactic categories and hence results in the reallocation of one class of linguistic phenomena to another component of the grammar. This is a tendency that is seen to be repeated with respect to other linguistic phenomena as the theory develops.

From the early days of transformational grammar, it had been assumed that the relationship that exists between an anaphoric pronoun and its antecedent, in sentences such as (34), where *Alice* and *she* can be interpreted as referring to the same individual, was to be captured by a transformation:

Alice said that she should go. (34)

The standard analysis of anaphoric pronouns (Lees & Klima 1969) assumed that they were derived from an underlying structure containing two identical occurrences of an NP. One of the NPs would be obligatorily converted into a pronoun by the pronominalization transformation:

Pronominalization (35)

$$X-NP_1-Y-NP_2Z \rightarrow X-NP-Y-NP_2[+Pro]Z$$

where $NP_1 = NP_2$ [and various conditions on the topological relations between the two NPs were satisfied].

Jackendoff (1972) argued instead for a treatment of pronominal anaphora which relied on rules of semantic interpretation (an 'interpretive' approach to pronominalization). Jackendoff pointed out that the condition requiring identity between the two NPs (which must include not only syntactic identity but also identity of reference) is unexpected given that coreference is not generally a condition on the application of transformations; no movement rule, for example, is constrained to apply only to coreferential NPs.

Jackendoff's proposal assumed that anaphoric pronouns were base-generated in underlying structure and that rules of semantic interpretation established the necessary connection between them and their antecedents; no transformation of any kind was involved. This approach had a number of empirical consequences. It provided the basis for a solution to the problem that, in sentences containing quantified NPs such as *every runner*, the transformational treatment of prominalization predicts incorrectly that *Every runner expects that she will win* should have the interpretation associated with *Every runner expects that every runner will win.*

Furthermore, there are cases of anaphora which do not involve pronouns. Such sentences as *I wanted to help Harry, but the fool wouldn't let me* allow a coreferential interpretation of *Harry* and *the fool.* In addition, the conditions on the configurations in which anaphora is possible are shared by pronominal anaphors and by 'epithets' like *the fool.* For example, neither permit an anaphoric interpretation in sentences like the following *He/the fool said Harry would leave.* It is implausible to envisage a transformation giving rise to epithets, but no problems arise in principle in assuming that epithets are assigned interpretations by the same semantic rules that interpret pronouns. Note also that Jackendoff's proposal is consonant with the lexicalist hypothesis in not allowing a transformation to radically alter the morphological shape of lexical material.

The net conclusion of these and other arguments is that pronominalization is not a transformation and that the phenomenon of pronominal anaphora falls within the domain of the semantic component of the grammar.

Similar arguments apply to two other long-established transformational analyses; those of reflexivization and equi-NP deletion. Reflexivization was assumed to work in complementary distribution with pronominalization; roughly, where the latter applied to identical NPs which were separated by a clause boundary, the former applied to identical NPs in the same clause. Thus *Mary was proud of Mary* would give *Mary was proud of herself.* Note, however, that when a quantified NP is involved, the result is the same as in the case of pronominalization; *Every runner is proud of herself* does not have the same interpretation as *Every runner is proud of every runner.* Equi-NP deletion, which derives *Mary wanted to win* from *Mary wanted Mary to win* exhibits the same phenomenon; *Every runner wanted to win* does not have the same interpretation as *Every runner wanted every runner to win.* As a consequence, proponents of the interpretive semantics position argued that neither reflexives nor the control phenomena handled by equi-NP deletion were the responsibility of the transformational component. Instead, reflexive pronouns should be base-generated and interpreted by the semantic component. For 'equi' sentences it was proposed that the subject position of the nonfinite subordinate clause was filled by a base-generated phonologically empty pronominal (PRO), also interpreted by the semantic component.

The result of these proposals was the removal from the transformational component of responsibility for a whole class of linguistic phenomena—those involving coreference—resulting in a more constrained theory of transformations and a superior account of the empirical data.

4.3 Constraints on Movement Rules

4.3.1 *Structure Preservation*

The lexicalist hypothesis and interpretive semantics reduced the range of phenomena to be accounted for by the transformational component. For those transformations that remained, a major goal of the extended standard theory was to remove from the theory the capacity for individual transformational rules to contain detailed specifications of the conditions of their application, and to replace them with general conditions applying to all transformations, or to whole classes of transformations. This goal may be summarized as that of restricting the expressive power of transformations.

It was noted above that the precise manner in which the derived constituent structure resulting from the application of a transformation was determined was unclear and that various ad hoc measures were adopted, such as stipulating derived constituent structure in the structural change of the rule or introducing 'dummy' elements to act as the landing site of a moved constituent. This issue received a more highly-motivated solution in proposals by Emonds (1976). Emonds established three different classes of movement transformations:

Root transformations (36)
Those that crucially involved the root (roughly speaking the topmost) S node, and hence do not apply in subordinate clauses. Examples include Subject-Auxiliary Inversion (*Isn't it cold today*), Directional Adverb Preposing (*Down the street rolled the baby carriage*) and Topicalization (*Our daughters we are proud of*).

Local transformations (37)
Those that involve the reordering of two adjacent constituents, one of which is phrasal and the other nonphrasal. An example is Particle Movement (cf. *She picked up the book* and *She picked the book up*).

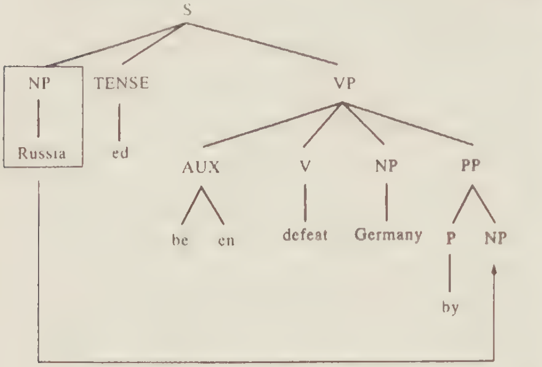
Structure Preserving Transformations (38)
Those that involve the replacement of a node by one of the same syntactic category. Examples include Passive, Raising, There-insertion (*A book is on the table ⇒ There is a book on the table*) and Dative Movement (*gave a ticket to John ⇒ gave John a ticket*).

The phenomena handled by root and local transformations have been subject to reanalysis more recently, but the essence of the structure preserving hypothesis has been accepted by all subsequent work.

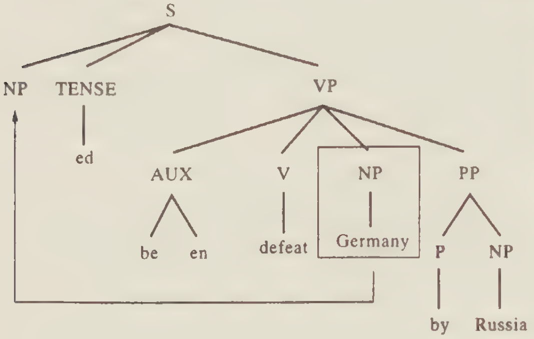
Emonds argued, like Chomsky, that the passive transformation is in fact a composition of two separate rules: one that postposes the agent NP into the position of *by*-phrase object; and one that preposes the object NP into the vacant subject NP position.

This requires that the derivation of *Germany was defeated by Russia* looks like this:

Agent Postposing: (39)



(40)



The structure-preserving hypothesis requires that the *by*-phrase be present in deep structure and that the NP within it be lexically empty (note that this implies that lexical insertion need not take place at deep structure). This analysis accounts for the fact that the passive *by*-phrase is like any other PP with respect to its internal structure and transformational behaviour.

Emonds points out that the fact that PPs under VP are generally optional in English, when combined with the structure-preserving analysis of passive, accounts automatically for the existence of agentless passives (*Germany was defeated*), in contrast to early analyses which had postulated a rule of by-phrase deletion.

Emonds's proposals constituted a step in the direction of removing from the structural description and structural change of a transformation the necessity, or even the possibility, of specifying where a constituent could be moved to; e.g., if the structure involved is not a root S and the transformation does not involve two adjacent constituents, the only possibility is for the moved constituent to move to a location in which the phrase structure rules permit a constituent of that type to be generated.

4.3.2 *Blind Application of Transformations*

The 1970s saw major steps toward the goal of replacing conditions on specific transformations with general conditions which, instead of forming part of individual grammars, were a component of universal grammar. Chomsky (1973) noted that, if the structural description of the passive transformation in English were taken to be essentially:

X, NP, V, NP, Y (41)

with no reference to conditions requiring the two NPs to be members of the same clause (as had been standardly assumed), the transformation would apply to the deep structure analysis of a sentence like *I believe the dog to be hungry*, namely [$_S$ *I believe* [$_S$ [$_{NP}$ *the dog*] [$_{VP}$ *to be hungry*]] without the necessity for raising to move the NP *the dog* into the higher clause. Without any restriction on its operation, passive (and other transformations) would apply 'blindly' to any structural configuration meeting the structural description. Viewed in this way there is no problem in accounting for sentences such as *The dog is believed to be hungry by me*. Instead, there is a question as to why passive does not apply to *I believe the dog is hungry* to give **The dog is believed is hungry by me*. Chomsky's conclusion was that the failure of the passive to apply to the latter sentence is to be attributed to a general condition on transformational rules to the effect that no item may be extracted from a tensed (finite) clause. This constraint is phrased as follows:

The Tensed-S Condition (TSC) (42)

No rule can involve *X*, *Y* in the structure

$\ldots X \ldots [_{a} \ldots Y \ldots] \ldots$ [where *a* is a tensed sentence]

Chomsky's discussion of reciprocals (*each other*) illustrates the application of the TSC. Following Dougherty (1970), he assumes that *each* in sentences such as (43):

The men hated each other. (43)

originates in deep structure as part of the subject NP as in (44):

The men each hated the others. (44)

and is moved out of it by a transformation ('each' movement) to give the structure in (43). The TSC explains why this movement is not possible in sentences like *The men each expected* [$_S$ *the others would win*] to give **The men expected* [$_S$ *each other would win*], and why movement of *each* is possible in the nonfinite counterpart *The men each expected* [$_S$ *the others to win*], giving *The men expected* [$_S$ *each other to win*].

However, given the grammaticality of *The men expected* [$_S$ *to shoot each other*], in which *each* appears in the object NP of the lower clause, the TSC does not account for the ungrammaticality of **The men* *expected* [$_S$ *the soldier to shoot each other*]. To account for this paradigm, Chomsky proposed the specified subject condition:

Specified Subject Condition (ssc) (45)

No rule can involve *X*, *Y* in the structure

. . . *X* . . . [$_\alpha$ . . . *Z* . . . - *WYV* . . .] . . .

where Z is the subject of *WYV* in α, α is a cyclic node (NP or S) and α contains a subject distinct from *Z* and not controlled by *X*.

'Control' is the relationship which holds between PRO and its antecedent in 'Equi' constructions, or between a 'trace' (see below) and its antecedent. Any subject meeting the additional criterion in (45) is a 'specified subject.'

This provides an account of the difference between:

We promised Bill [$_S$ PRO to kill each other]. (46)

and:

*We persuaded Bill [$_S$ PRO to kill each other]. (47)

In (46) *each* originates in the deep structure as part of the NP containing *we*, which is the controller of PRO and moves into the subordinate sentence by 'each movement' (cf. (44) above); whereas in (47) the controller of PRO is the NP *Bill* which does not contain *each* at any level of representation. PRO in (47) is therefore a specified subject. Note that any phonologically realized NP (such as *the soldier* in (45)) is a specified subject, and also blocks the application of 'each' movement.

Under standard assumptions, there was an immediate counter-example to these conditions: the rule of *wh*-movement. (so called because it moves phrases which contain the class of interrogatives and relatives that begin with the letters 'wh,' such as *who*, *which*, and *what*—as well as various others not fitting this description, such as *how*). *Wh*-movement is the rule responsible for deriving sentences such as:

Who did John kill? (48)

Since *kill* is a transitive verb, it is expected to have a direct object, yet no NP follows the verb in (48). The reason for this is that the requirement for an object NP is satisfied at deep structure, and the NP concerned, *who*, is moved to its surface structure position by a transformation.

In contrast to the transformations discussed so far, *wh*-movement has the property of being 'unbounded.' That is to say, that there seems to be no principled limit on the amount of material that can intervene between the deep structure position of the *wh*-item and its surface structure position, as the following examples illustrate (the underscore marks the position from which *who* has moved):

Who does Max think John killed__? (49)

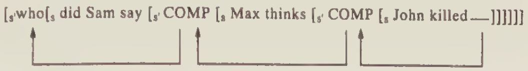
Who did Sam say Max thinks John killed__? (50)

Note that in these examples the clause which contains the extraction site of *who* is a finite one and, in addition, contains a specified subject (*John*). According to the TSC and SSC these sentences should not be possible.

Chomsky's solution to this problem was the radical proposal that, contrary to appearances, *wh*-movement is a cyclic rule. He adopted a proposal made by Bresnan (1970) that *wh*-movement involves moving the *wh*-phrase into the complementizer position of a clause—roughly speaking, the clause-initial position occupied by *that* or *whether*. This position, known as COMP, has the status of an 'escape hatch' for movement; movement to or from the COMP position does not violate the TSC or SSC.

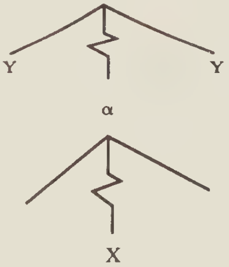
The derivation of (50) would thus proceed as in (51):

(51)



[$_{S'}$who[$_S$ did Sam say [$_{S'}$ COMP [$_S$ Max thinks [$_{S'}$ COMP [$_S$ John killed —]]]]]]

To enforce the cyclic application of *wh*-movement (and prevent the movement of *who* in (51) from its deep to surface structure positions in one fell swoop), Chomsky proposed a further condition on movement rules: 'subjacency.' A node *X* is 'subjacent' to another node *Y* only if *Y* is higher in the tree than *X* and there is at most one cyclic node that dominates *X* and does not dominate *Y*. This is illustrated diagrammatically below, where α is a cyclic node (that is, NP or S):



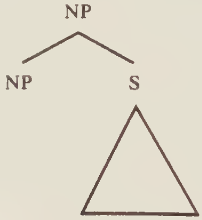
The subjacency condition requires that no movement can take place from *X* to *Y* unless *X* is subjacent to *Y*. Checking (51) will confirm that the combination of COMP as the landing-site for *wh*-movement and subjacency precludes any other derivation than the one indicated.

Subjacency also provides an account for a class of phenomena known, since Ross (1967), as 'islands.' Despite the apparent unboundedness of *wh*-movement, it had been known for some time that there are constructions out of which *wh*-movement is prevented for some reason from moving *wh*-items. Chomsky (1964a) had observed that while the sentence *John kept the car in the garage* is ambiguous (meaning either that the car in the garage was kept by John, or that the car was kept in the garage by John), the sentence *Which car did John keep in the garage* is not, having only the latter reading. The nonexistent reading is the one in which the NP *the garage* is contained within the larger NP *the car in the garage*. Chomsky had proposed that in a situation like this, where a transformation might in principle apply to either of two NPs, in fact it must apply only to the larger one. This proposed constraint he termed the 'A-over-A principle.'

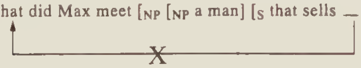
Ross (1967) gave a detailed investigation of a wide range of situations in which the application of unbounded movement rules was blocked. Ross pointed out that the A-over-A principle proved too strong in certain cases and identified the defining characteristics of the phenomenon as a set of structural configurations which he termed 'islands,' and proposed a corresponding set of 'island constraints' to restrict the application of unbounded movement rules:

Complex NP Constraint (CNPC) (52)

No item may be moved out of a complex NP by transformation, where a 'complex NP' is a structure of the following form.



Example: Max met a man that sells books/what
*What did Max meet [$_{NP}$ [$_{NP}$ a man] [$_{S}$ that sells —]]



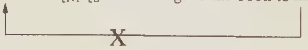
Sentential Subject Constraint (53)

No item may be moved out of a sentential subject by a transformation.

Coordinate Structure Constraint (CSC) (54)

No conjunct in a coordinate structure may be moved, nor may any item in a conjunct be moved out of that conjunct.

Example: That John gave the book to Max/who surprised Sam
*Who did [$_{NP}$ [$_{S}$ that John gave the book to —]] surprise Sam



Left Branch Condition (55)

No NP on the left branch of another NP may be moved out of that NP.

Example: Max spoke to Sam/who and Fred
*Who did Max speak to[$_{NP}$ —and Fred]

The subjacency principle serves to provide a unified account of all these island phenomena except the coordinate structure constraint. Note that in all other cases but coordinate structures, the movement involves a violation of subjacency. To illustrate with the last example, in **Whose* [$_{S}$ *did you read* [$_{NP}$—*book*]] two cyclic nodes, S and NP, intervene between *whose* and the extraction site.

Chomsky also proposed that subjacency would account for the prohibition on moving two (or more) *wh*-phrases out of the same clause (the *wh*-island constraint), as in **What* [$_{S}$ *do you wonder* [*who* [$_{S}$—*saw*—]]. On the assumption that, once the COMP node of the lower clause is occupied by *who*, it is no longer a possible landing-site for *what*, the only route to the topmost COMP will involve crossing two S nodes – a subjacency violation.

4.4 Trace Theory

The developments outlined in the preceding sections resulted in a situation where the substantive content of transformations had been severely reduced. Lexicalism had removed many linguistic phenomena from the domain of the transformational component, as had the reanalysis of phenomena involving coreference; structure preservation reduced the need to specify details in the structural descriptions of transformations, and subjacency limited the domain of application of transformations.

Chomsky (1973) had introduced the idea that movement of an NP left behind a 'trace' of itself. He developed this idea further (Chomsky 1976). He proposed that all movement transformations leave behind a phonetically empty copy (a 'trace') bound by the moved constituent and inheriting all its relevant properties. He points out the pattern of reciprocal interpretation (now effected by an interpretive rule, rather than the transformation of 'each' movement) supports the postulation of such an empty category in sentences involving raising to subject. There is a parallel between (56) and (57), where reciprocal interpretation in (57) allows *each other* and *the men* to be construed together, just as if they were in the same clause, as in (56):

The men like each other. (56)

The men seem to John [*t* to like each other]. (57)

There is a similar parallel between (58) and (59), where reciprocal interpretation is blocked by the SSC. This insight is captured explicitly by the occurrence of a trace of NP preposing in (57) which participates in the interpretation of *each other* and one in (59) which forms a specified subject since it is bound by the singular moved NP *John*, blocking reciprocal interpretation with *men* just as the overt occurrence of *John* does in (58):

*The men want [John to like each other]. (58)

*John seems to the men [*t* to like each other]. (59)

Lasnik (1977) drew a parallel between the relationship which exists between traces and their binders and that which exists between PRO and its controller and between a reciprocal and its antecedent: always the binder must precede or asymmetrically 'command' the trace. (A commands B if the first S node that dominates A also dominates B.) This means that movement must always be leftward or to a higher position in a tree. Hence raising is a possible movement rule, but its inverse, 'lowering,' would not be. Similarly, *wh*-movement must always be to a higher COMP node and never to a lower one.

With these developments, Chomsky proposed a constraint on transformations to the effect that the only categories that may be explicitly mentioned in a structural description are those that are changed (i.e., moved, deleted etc.) by the rule. He also suggests that a further step can be taken in the light of the structure preserving hypothesis, which entails that, for example, an NP can only be moved into another NP position. 'Thus the rules in question [e.g., passive] reduce to the following formulation: move NP' (Chomsky 1976: 313).

All other details of the operations carried out by the rule are determined by general principles, the landing site being determined by a combination of the structure preserving hypothesis, subjacency, and Lasnik's condition.

This move was accompanied by a reinterpretation of the status of conditions like the TSC and the SSC, which ultmately spells the end of transformational grammar as such and its evolution into government-binding theory. At their inception, these conditions were construed as constraints on rules, blocking their application. Chomsky now proposed construing them as conditions on surface structure well-formedness. That is to say, 'move NP' can apply freely, but the resulting representations must satisfy the TSC and the SSC. To take a specific example, *John seems* [*t to like Bill*] is the result of move NP and the trace is bound by an NP (*John*) as required by Lasnik's proposal. In **John seems* [*Bill to like* t], although NP movement has applied, the resulting configuration violates the SSC, on the assumption that the relationship between an NP and its trace is just like the one that holds between a reciprocal and its antecedent. The trace does not stand in the appropriate relationship to *John*, any more than *each other* does to *they* in **They expect* [*Bill to like each other*].

In 'On binding' Chomsky (1980) took this development a stage further and proposed that the SSC (renamed the 'opacity condition') and the TSC (renamed first the 'propositional island condition,' or PIC, and then the 'nominative island condition,' or NIC) should be reinterpreted as constraints on the occurrence of anaphors alone, rather than as relations between anaphors and their antecedents. The opacity condition took the form 'if α is an anaphor in the domain of the subject of β, β minimal, then α cannot be free in β, β=NP or S′. The nominative island condition took the form: A nominative anaphor cannot be free in S′. 'In the domain of' means 'c-commanded by,' where A c-commands B if the first branching node which dominates A also dominates B (a revision of Lasnik's 'precede or command'). 'Free' means not coindexed with a c-commanding antecedent. Nominative case is assigned only to the subjects of finite clauses.

To take up the analysis of *each other* to exemplify the revised framework, Chomsky suggests that all that need now be said about the distribution of *each other* is that it is a reciprocal. From this, within an appropriately articulated theory of grammar, will follow the requirement that it be bound by a plural antecedent within the same S′ or NP, if it is not itself a subject, so that (60) is grammatical with *each other* bound by *the students* within the minimal S′:

John expected [$_{S'}$ the students to like each other]. (60)

(61), however, is ill-formed, because *each other* has no acceptable antecedent within S′:

*The students expected [$_{S'}$ John to like each other]. (61)

(62) is ill-formed because the lower clause is finite. Its subject *each other* is therefore nominative and, according to the NIC, must be bound in S′. But, in this structure there is no possible c-commanding binder within S′, so the sentence is defined as ungrammatical:

*The students expected [$_{S'}$ to each other would to like John]. (62)

Earlier, Chomsky (1977) had argued that what had been considered a range of different transformations should all be interpreted as expressions of *wh*-movement. These included not only *wh*-questions and relative clauses, but also topicalization (63a) (and its associated analysis in 63b), *Tough*-movement (64a) and (64b), comparatives and cleft sentences, although most of these do not occur with overt *wh*-phrases in them:

This book, I asked Bill to get his students to read. (63a)

[$_{S''}$[$_{TOP}$ This book] [$_{S'}$ [$_{COMP}$ what] I asked Bill to get his students to read **t**]]. (63b)

John is easy for us to please. (64a)

John is easy for us [$_{S'}$[who for] PRO to please t]]. (64b)

John is taller than Mary is. (65a)

John is taller than [$_{S'}$[what] Mary is *t*]]. (65b)

Chomsky's argument was founded on the claim that all these constructions exhibit the defining characteristics of *wh*-movement:

a. it leaves a gap; (66)

b. there is an apparent violation of subjacency, PIC and SSC;
c. it observes the complex NP constraint;
d. it observes *wh*-island constraints.

For example, the comparative in (67) and the *wh*-question (68) both demonstrate a violation of the complex NP constraint, while the comparative in (69) and the *wh*-question (70) both demonstrate parallel violations of the *wh*-island constraint:

*Mary is taller than (what) Bill believes [$_{\text{NP}}$ the claim that she is__]. (67)

*Who does Bill believe [$_{\text{NP}}$ the claim that she met__]. (68)

*Mary is taller than (what) [I wonder [whether she used to be__]]. (69)

*Who [does Bill wonder [whether she met__]]. (70)

The set of transformational movement rules was now reduced to two: 'move NP' and 'move *wh*' and in *On binding* Chomsky proposed that it could be reduced still further to 'move α,' where α is some category of the grammar. Move α will apply freely, but the resulting structures must satisfy the relevant constraints.

Transformational grammar, as it had been envisaged originally, was about to evolve into a theory in which transformations themselves played a relatively minor role. The task of specifying the operations which transformations were entitled to perform was to be replaced by the task of specifying well-formedness conditions on the representations which resulted from the operation of transformations and other kinds of rules. The only constraint specific to transformations was, and remains, subjacency.

Transformational grammar constituted a major breakthrough in the investigation of the syntax of human languages and spawned an unprecedented amount of research, providing many new insights into language and its structure. It has been a topic of controversy since its inception, and a variety of alternatives now exist which challenge the very bases of transformational theory; but it is fair to say that many of them have developed in response to positions articulated within transformational grammar and it is doubtful that they would have come about without the stimulus and insights provided by transformational grammar. It is certainly true that our understanding of human language would be much impoverished had it not existed.

Bibliography

Bresnan J 1970 On complementizers: Toward a syntactic theory of complementation. *Foundations of Language* **6**: 292–321

Carroll J M, Bever T G 1976 Sentence comprehension: A case study in the relation of knowledge and perception. In: Carterette E C, Friedman M P (eds.) *The Handbook of Perception*. Academic Press, New York

Chomsky N 1957 *Syntactic Structures*. Mouton, The Hague

Chomsky N 1964a *Current Issues in Linguistic Theory*. Mouton, The Hague

Chomsky N 1964b A transformational approach to syntax. In: Fodor J A, Katz J J (eds.) *The Structure of Language*. Prentice-Hall, Englewood Cliffs, New Jersey

Chomsky N 1965a *Aspects of the Theory of Syntax*. MIT Press, Cambridge, Massachusetts

Chomsky N 1965b Three models for the description of language. In: Luce R D, Bush R R, Galanter E (eds.) *Readings in Mathematical Psychology*. John Wiley, New York

Chomsky N 1970 Remarks on nominalization. In: Jacobs R, Rosenbaum P S (eds.) *Readings in English Transformational Grammar*. Blaisdell, Waltham, Massachusetts

Chomsky N 1973 Conditions on transformations. In: Kiparsky P, Anderson S (eds.) *A Festschrift for Morris Halle*. Holt, Rinehart & Winston, New York

Chomsky N 1975 *The Logical Structure of Linguistic Theory*. Plenum, New York

Chomsky N 1976 Conditions on rules of grammar. *Linguistic Analysis* **2**: 303–51

Chomsky N 1977 On *wh*-movement. In: Culicover P, Wasow T, Akmajian A (eds.) *Formal syntax*. Academic Press, New York

Chomsky N 1980 On binding. *Linguistic Inquiry* **11**: 1–46

Dougherty R S 1970 A grammar of coordinate conjoined constructions. *Language* **46**: 850–98

Emonds J 1976 *Transformational Approach to English Syntax: Root, Structure-preserving and Local Transformations*. Academic Press, New York

Fillmore C 1963 The position of embedding transformations in a grammar. *Word* **19**: 208–31

Harris Z S 1952 Discourse analysis. *Language* **28**: 18–23

Jackendoff R 1972 *Semantic Interpretation in Generative Grammar*. MIT Press, Cambridge, Massachusetts

Katz J J, Postal P M 1964 *An Integrated Theory of Linguistic Descriptions*. MIT Press, Cambridge, Massachusetts

Lakoff G 1970 *Irregularity in Syntax*. Holt, Rinehart & Winston, New York

Lakoff G 1971 On Generative Semantics. In: Steinberg D, Jakobovits L (eds.) *Semantics*. Cambridge University Press, Cambridge

Lasnik H 1977 On trace theory. *Linguistic Inquiry* **8**: 35–61

Lees R B 1966 *The Grammar of English Nominalizations*. Mouton, The Hague

Lees R B, Klima E S 1969 Rules for English pronominalization. In: Reibel D A, Schane S (eds.) *Modern Studies in English*. Prentice-Hall, Englewood Cliffs, New Jersey

McCawley J D 1968 Lexical insertion in a transformational grammar without deep structure. In: *Papers from the Fourth Regional Meeting of the Chicago Linguistic Society*. Chicago, Illinois

McCawley J D 1970 English as a VSO language. *Language* **46**: 286–99

Newmeyer F J 1980 *Linguistic Theory in America*. Academic Press, New York (2nd edn., 1986)

Peters S, Ritchie R W 1973 On the generative power of transformational grammars. *Information Sciences* **6**: 49–83

Rosenbaum P 1967 *The Grammar of English Predicate Complement Constructions*. MIT Press, Cambridge, Massachusetts

Ross J R 1967 *Constraints on variables in syntax* (Doctoral dissertation, Massachusetts Institute of Technology)

Generative Semantics

James D. McCawley

The term 'generative semantics' (GS) is an informal designation for the school of syntactic and semantic research that was prominent from the late 1960s through the mid-1970s and whose best-known practitioners were George Lakoff, James D. McCawley, Paul M. Postal, and John Robert Ross.

1. GS Positions on Controversial Issues

The name GS gives undue prominence to one of many issues on which GS-ists took positions that conflicted with those of more orthodox generative grammarians, an issue that in hindsight seems arcane because it is intelligible only against the background of the once widely accepted assumption (shared then by GS-ists and their adversaries) that there must be a single level of linguistic structure for which it is appropriate to give a system of 'generative rules' (i.e., rules giving a complete specification of what structures are well-formed on that level) and to which all other levels of structure are related by 'interpretive rules.' The issue commemorated in the name GS was that of whether the privileged level was semantic structure (the GS position) or was a level of syntactic structure as distinct from semantic structure (the position of Chomsky and other 'interpretive semanticists'). The prominence that has been given to that arcane issue should not obscure the fact that GS-ists disagreed with other generative grammarians on many far more substantial issues, such as the following:

(a) Whether sentences were 'grammatical' or 'ungrammatical' in themselves rather than relative to (linguistic and extralinguistic) contexts and to possible interpretations. GS-ists rejected the then popular idea that a language can be identified with a set of sentences and took syntactic derivations as implying that the surface form in question was grammatical not absolutely but only relative to the meaning represented in its deep structure and to any contextual factors to which steps in the derivation are sensitive.

(b) The nature of semantic structure. GS-ists held that semantic structures have the same formal nature as syntactic structures, except for having semantic rather than morphological entities as their ultimate constituents, while interpretive semanticists either were reluctant to make any concrete claims about the nature of semantic structure (e.g., Chomsky 1972: 137) or adopted a conception of semantic structure that differed considerably in formal nature from syntactic structure (e.g., Jackendoff 1972).

(c) The nature of syntactic categories. Much work in GS attempted to reduce syntactic category distinctions to distinctions of logical category, supplemented by lexical 'exception features' (e.g., verbs and adjectives would both belong to the category 'predicate,' usually confusingly called 'V' by GS-ists, with adjectives differing from verbs in bearing a feature licensing the application of a transformation that inserts a copula), while other generative grammarians took syntactic categories to have at most a tangential relation to semantic categories.

(d) The linguistic level or levels relevant to the choice of the lexical material of a sentence. One who holds that there is no level of syntactic deep structure as distinct from semantic structure is forced to recognize syntactic structures whose ultimate units are semantic rather than morphological in nature, such as a syntactic structure [Brutus DO SOMETHING$_X$ (X CAUSE (BECOME (NOT (Caesar ALIVE))))] underlying *Brutus killed Caesar*. (Here and below, capitalization is used as an informal way of representing semantic units corresponding roughly to the words in question.) GS-ists accordingly proposed transformations that combined semantic units into complexes that could potentially underlie lexical items, e.g., 'predicate-raising' (proposed in McCawley 1968) adjoined a predicate to the immediately superordinate predicate, thus allowing the derivation of such complexes as NOT-ALIVE, BECOME-NOT-ALIVE (=*die*), BECOME-NOT (=*cease*), and CAUSE-BECOME-NOT-ALIVE or CAUSE-*die* (=*kill*). Intermediate derivational stages involving both lexical and semantic units (such as CAUSE-*die*) needed to be recognized in order to account for, e.g., the parallelism between idiomatic combinations with *come* (*come about*, *around*, *to*, ...) and their counterparts with *bring*: as Binnick (1971) noted, *bring* corresponded not to CAUSE plus some determinate complex of semantic material but to CAUSE plus *come*, irrespective of whether *come* was used as an independent lexical unit or as part of such combinations as *come about*. Consequently, lexical insertion could not be restricted to a single linguistic level: applications of certain transformations had to be interspersed between lexical insertions. The combinations that could be derived through the application of predicate-raising and other 'prelexical' transformation were supposed to underlie 'possible lexical items.' Since there are infinitely many such combinations but only finitely many actual lexical items in any given language, most correspond to no actual lexical item of the language and were supposed to reflect accidental gaps in the lexicon of the language.

Lexical decomposition analyses were criticized in such works as Fodor 1970, where it was argued that the simple and complex surface forms that supposedly corresponded to the same deep structure (e.g., *Brutus killed Caesar* and *Brutus caused Caesar to die*) did not in fact have the same meanings. It was noted subsequently (McCawley 1978) that such discrepancies in interpretation can be explained by a version of Grice's (1967/1989) maxim of manner according to which a simple surface form is preferred to a more complex alternative except when the referent is a peripheral instance of the category defined by the given semantic structure, e.g., using indirect means to cause someone to die would be a peripheral instance of the category defined by 'cause to cease to be alive' and thus would not be in the part of that category where *kill* would preempt the use of *cause to die*. (Syntactic analyses involving lexical decomposition also figured prominently in Gruber 1965, a work that early GS-ists found congenial despite some important differences between its framework and theirs.)

2. GS Policies on the Conduct of Research

Of equal importance to these points of theory in their influence on the directions that GS research took and the reception that GS work received were several policies about the conduct of linguistic research, of which the following deserve mention here:

(a) A lack of concern about the compartmentalization of the parts of a linguistic analysis or of a linguistic theory, as contrasted with the concern among Chomskyan generative grammarians with the drawing of boundaries among, e.g., syntax, semantics, and pragmatics. One important facet of this lack of concern was an egalitarian position regarding the different kinds of data that had a bearing on a linguistic analysis: whereas most generative grammarians held that syntactic analyses needed to be supported by arguments in which only syntactic facts figured, GS-ists held that facts about truth conditions, possible denotations, etc., were as relevant as any other kind of facts to evaluating analyses that purported to specify how meanings corresponded to surface forms in the given language, and that supposed syntactic facts were usually at least partly semantic in nature, in that what a speaker of a language judges acceptable is not a sentence in itself but that sentence relative to an assumed understanding of it. Another facet of this policy was GS-ists' insistence that all parts of a linguistic analysis were subject to the same standards of explicitness, simplicity, and factual accuracy, irrespective of how one might wish to demarcate syntax and semantics; by contrast, interpretive semantics has come only gradually and often grudgingly to subject the semantic parts of analyses to the same standards of appraisal as the syntactic parts.

(b) Rejection of the dogma of generative grammar that a fixed notational system is essential to a linguistic theory and that precision can be achieved only by formulating one's analyses in the privileged notational system.

(c) Adoption of a 'static' conception of linguistic rules: rules were thought of not in terms of the popular metaphor of assembling linguistic structures and converting structures on one level into corresponding structures on another, but as 'derivational constraints,' that is, as specifications of what a structure may or may not contain and of how a structure on one level may or must differ from the corresponding structure on another level. This difference in the conception of rules resulted in differences with regard to what theoretical notions posed 'conceptual problems' (Laudan 1976) for each approach; thus GS-ists readily accepted rules that specified relations among nonadjacent levels of structure (what Lakoff 1970b dubbed 'global rules'), a notion that was unproblematic from their conceptual vantage point but outlandish from the vantage point of the 'operation' metaphor for rules, while rejecting the idea of ordering among rules, a notion that was unproblematic for those who accepted the 'operation' metaphor but was difficult to make coherent with the GS conception of rules as derivational constraints.

(d) Disdain for those concerns of Chomskyan generative grammarians that had little connection with linguistic facts or with detailed linguistic description, such as mathematical models and speculation about the extent to which linguistic structure is biologically determined. While GS-ists were receptive to the idea that linguistic structure is profoundly influenced by neuroanatomy, they demanded (e.g., Lakoff 1974: 171) that claims to that effect be backed up with solid linguistics and solid biology rather than with what they dismissed as arguments from ignorance (i.e., hasty leaps from one's failure to see how some characteristic of languages could be learned to the conclusion that it must be innate).

(e) Eagerness to put in practice in their professional lives many of the ideas of the 1960s counterculture, such as policies of antiauthoritarianism, antielitism, and demystification of science and scholarship, and a belief that one's work should be pleasurable. One of many facets of the GS ethos that these policies helped to shape is what Newmeyer (1986: 133) has disparaged as 'data-fetishism': joy in the unearthing of novel and intriguing facts for which one is not yet in a position to provide a satisfactory analysis; GS-ists, by contrast, regarded Chomskyan generative grammarians as 'scientific Calvinists' (McCawley 1980: 918).

3. Prominent and Influential Analyses Proposed within the GS Approach

Kuhn (1970) notes that one major component of the paradigm of a scientific community is a set of 'exemplars': prestigious solutions to problems, presented to neophytes in the field as paragons of good science, and serving as models for solutions to new problems. (For discussion of the history of generative grammarians' analyses of English auxiliary verbs in terms of Kuhnian notions such as 'paradigm' and 'exemplar,' see McCawley 1985.) The exemplars for the GS community included a number of analyses that bore an intimate relation to central tenets of GS, for example, lexical decomposition analyses such as were discussed in Sect. 1, and analyses of quantified expressions as being external to their host sentences in deep structure (e.g., *John has read many books* = *many books* + *John has read x*) and as being moved into their surface positions by a transformation of Quantifier-Lowering (QL). (The term QL was in fact applied indiscriminately to a variety of transformations that differed according to the specific deep structure that was assumed; proposals differed with regard to whether just a quantifier or a whole quantified expression was external to the host S, what filled the deep structure position into which the quantified expression was to be moved, and where the quantifier or quantified expression was in relation to the host S.) The best-known arguments given for a QL analysis consisted in demonstrations that the many syntactic rules that were problematic when applied to structures that contained quantified elements became unproblematic if the deep structure position of a quantified expression was external to its host sentence and consequently (in virtue of the principle of the cycle) the rule had as its domain of application a structure that does not contain the quantified expression; for example, this view of the interaction between QL and the transformation of 'Reflexivization' explained why such pairs of sentences as *Every philosopher admires himself* and *Every philosopher admires every philosopher* differed in meaning in the way in which they did, and why reflexivization was applicable only in the derivation of the former. A thorough survey of arguments for a QL analysis is given in McCawley (1988: ch. 18).

Several other GS exemplars were in fact as consistent with the substantive claims of interpretivist transformational grammar as with those of GS, but were embraced by GS-ists and rejected by interpretive semanticists as much because of policies on the conduct of research (see Sect. 2) as because of any points of linguistic theory, or simply because of the historical quirk that a particular idea occurred to a member of the one camp before it occurred to any of his counterparts in the other camp. One such exemplar is the analysis of English auxiliary verbs as being verbs that take nonfinite sentential complements in the manner of such verbs as *seem* (Ross 1969; McCawley 1971), which Pullum & Wilson 1977 subsequently argued for from within an interpretive semantic framework. (A similar treatment of auxiliary verbs is found in Jespersen 1937: 92). A second was the proposal (McCawley 1970, subsequently disavowed by the author) that English had underlying verb–subject–object (VSO) word order, a hypothesis that is, if anything, harder to reconcile with the assumptions of GS than with those of interpretive semantics in view of the dubious nature of the assumption that the order of elements is significant in semantic structure; by contrast, there is no general policy in interpretive semantic versions of generative grammar against discrepancies between deep and surface constituent order, and indeed languages with surface VSO word order are commonly analyzed by interpretive semanticists as having deep SVO word order. Another such exemplar is the 'performative analysis' (Ross 1970), in which sentences are assigned underlying structures in which a 'hypersentence' (Sadock 1969, 1974) specifies the illocutionary force of the sentence, e.g., *Birds fly* would have an underlying structure of the form [*I tell you* [*birds fly*]].

4. The History of GS

The term 'generative semantics' first appears in Lakoff (1963/1976), a work that antedates the development of the Katz–Postal–*Aspects* approach to syntax and prefigures some of Lakoff's subsequent GS work. GS originated in attempts by Postal and Lakoff to exploit novel possibilities that were opened up by the revisions of the transformational syntactic framework proposed in Katz & Postal (1964) and Chomsky (1965) and to fill gaps in the evolving framework. For example, Lakoff's PhD thesis (Lakoff 1965/1970) originated as an attempt to develop a precise and coherent account of the way in which a lexical item could affect the applicability of transformations to structures containing the given item, and thereby to put on a solider footing those analyses in Chomsky (1965) in which the choice of lexical items affected the possibilities for derivations. In the course of providing such a theory of 'rule government,' Lakoff realized that it could be exploited in ways that narrowed the distance between semantic structure and syntactic deep structure, for example, by treating inchoative and causative clauses in terms of underlying structures that contained a corresponding stative clause (e.g., the structures underlying *The door opened* and *He opened the door* would contain an embedded sentence corresponding to *The door is open*) and by treating certain part-of-speech distinctions as differences in the applicability of transformations that inserted a copula or adjoined a preposition to an NP. Similarly, an attempt to refine and add substance to Chomsky's hesitant suggestion (1965: 145) that referential indices were a part of underlying syntactic structures gave rise to the line of research in which McCawley (1968) argued that all rules whose application is contingent on the identity of two units are sensitive to the purported reference of those units and of their parts, provided one identifies correctly what units purport to refer and what units figure in identity requirements.

An identifiable GS research community came into being during the 1966–67 US academic year, when Lakoff & Ross taught year-long courses at (respectively) Harvard and MIT, in which they proposed and refined a large body of 'abstract syntax' analyses that provided much of the core of subsequent GS research and stimulated a considerable amount of research within their evolving framework by students at the two institutions. GS first attained prominence outside of the Harvard–MIT linguistic community at a conference at the University of Texas at Austin in March 1967 whose proceedings were published as Bach & Harms (1968). The GS community increased considerably in size during the Linguistic Institute held at the University of Illinois in summer 1968, at which numerous students were exposed to large doses of GS syntax and semantics in courses taught by Lakoff, McCawley, and Ross, including for the first time a detailed presentation of the conception of semantic structure that figured with increasing prominence in GS research. The fifth annual conference of the Chicago Linguistic Society (CLS), in April 1969, attracted a large proportion of those who were engaged in GS research and dwarfed all previous CLS conferences in attendance, number of submissions, and number of papers presented. For the next several years, the CLS conference served as a gathering of the GS clan, and the volumes of its proceedings contain a sizeable proportion of the published GS research that was done during those years.

The GS community rapidly decreased in numbers during the mid-1970s, until by the end of the decade no real GS community existed any longer. The reasons for this decline are a matter of controversy. It was not simply a matter of interpretive semanticists and others refuting theoretical claims of GS, since GS-ists and interpretive semanticists had comparable success in refuting the others' theoretical claims (see, e.g., the detailed dissection in McCawley 1975 of the positive claims put forward in Chomsky 1972 and of Chomsky's arguments against various tenets of GS). In several of the factual domains that figured prominently in disputes between GS and interpretive semantics, the facts were not what either camp predicted them to be. For example, adverbials that modified semantic constituents of the meaning of a semantically complex word (as in *He lent me his bicycle until Tuesday*, where *until Tuesday* modifies 'I have his bicycle') were neither always possible (as GS analyses in their pristine form implied) nor never possible (as tenets of interpretive semantics implied); neither camp ever succeeded in explaining which cases did and which did not allow such modifiers, though each continued to cite the cases that worked in the desired way as confirmations of its own position and refutations of the opposing position. (Situations in which two factions have solid grounds for claiming to have refuted the other's position are by no means rare in the history of science; Musgrave 1976 documents such a state of affairs in the dispute between phlogiston chemistry and oxygen chemistry between 1771 and 1785.) While the grammar of nominalizations played a major role in interpretive semanticists' attacks on GS and in the rationale for their 'lexicalist' framework, no detailed study of nominalizations was produced by any interpretive semanticist, and the only at all comprehensive study of normalizations produced in the 1970s (Levi 1978) was done in a GS framework.

Some factors that clearly played a role in the precipitous decline of GS are (a) the development of a variety of alternative approaches to syntax and semantics that for various reasons attracted substantial numbers of neophyte linguists and a certain number of erstwhile GS-ists; (b) the fact that leading figures of early GS devoted much of their attention during the 1970s to topics that were widely regarded as peripheral or irrelevant to syntax; and (c) the fact that the leading figures of GS stimulated few students to engage in GS research during that period (Postal held an industrial research position and thus did no teaching; Lakoff taught at Harvard and Michigan for only brief periods, and none of his Berkeley students finished their PhDs until after the decline of the GS community was far advanced; and after the departure of some congenial colleagues, Ross was the sole GS-ist on the faculty of a department that was otherwise openly hostile to GS). Newmeyer (1986: 132–38) speculates that the factors contributing to GS's rapid decline included the casual and at times flippant, vulgar, and dadaist style that GS-ists often affected, the willingness of leading GS-ists to allow the factual domain for which they held themselves and their theories accountable to expand beyond reasonable limits (Harris (1993: 230) refers to a popular view that GS 'tried to swallow the world and choked on it'), and that

'Generative semanticists simply gave up on attempting to *explain* grammatical phenomena.' The latter claim does not fit the historical facts, but a widespread impression of its truth may have been fostered by some of the policies on the conduct of research listed above in Sect. 2, as well as by the infrequency with which GS-ists used the word *explain* and its derivatives, as contrasted with the high frequency of that set of words in interpretive semantic works.

The one part of GS theory that can plausibly be implicated in the demise of the GS community is the GS treatment of syntactic categories, which is one of the few parts of GS theory that any prominent GS-ists have subsequently recanted (McCawley 1977, 1982). (One other recantation should be mentioned, namely Lakoff's (1987: 583–85) recantation of the GS policy of adopting a conception of semantic structure that was closely tied to formal logic and model theory.) Coincidentally, the radical revisions that interpretive semanticists were making in their versions of generative syntactic theory included the adoption of the 'X-bar' conception of syntactic categories, which identified two of the factors that affect the syntactic behavior of a linguistic unit, namely, the difference between a word unit and a phrasal unit, and the part of speech of the unit or of its head. Once a descriptive framework was available that allowed linguistic generalizations to be stated in terms of those factors, considerable progress was made in the analysis of the many syntactic phenomena in which those factors play a role.

No important tenets of GS rule out the adoption of a conception of syntactic categories as defined by these factors *in addition to* logical categories, and indeed a conception of syntactic categories as reducible to those and other factors (with logical category being merely one of several factors that influence a unit's syntactic behavior) is adopted in McCawley (1977, 1982) and subsequent works. However, in the 1960s and early 1970s, an assumption shared by GS-ists and interpretive semanticists impeded GS-ists from adopting such a conception of categories, namely the assumption that syntactic categories must remain constant throughout derivations: a word (with a determinate part of speech) that replaced a complex of semantic material (thus, a unit not having a part of speech) could not differ in category from the replaced unit and thus parts of speech could not be part of the category system. (The widespread misconception that GS analyses allowed linguistic units to change category in the course of derivations in their analysis of, for example, nominalizations overlooks the fact that, according to GS-ists' assumptions, verbs and their nominalizations belonged to the same category. Anyway, analyses of any kind in which the verb *invent* is a constituent of the noun *invention* are not committed to any assumption that the former changes its category in the derivation of the latter: it is whatever it is, regardless of what it is contained in.) Since interpretive semanticists did not require that deep structures match semantic structures (and indeed took delight in arguing that they did not match), there was no obstacle to their having the same categories in deep as in surface structures while drawing the full range of category distinctions provided for by X-bar syntax. The interpretive semantic research program was thus able to become 'progressive' in the sense of Lakatos (1978) because of something extraneous to the issues that were the loci of the substantive disputes between GS and interpretive semantics.

Bibliography

Bach E, Harms R T (eds.) 1968 *Universals in Linguistic Theory*. Holt, Rinehart & Winston, New York

Binnick R I 1971 'Come' and 'bring.' *Linguistic Inquiry* **2**: 260–67

Chomsky N A 1965 *Aspects of the Theory of Syntax*. MIT Press, Cambridge, Massachusetts

Chomsky N A 1972 *Studies on Semantics in Generative Grammar*. Mouton, The Hague

Fodor J A 1970 Three reasons for not deriving 'kill' from 'cause to die.' *Linguistic Inquiry* **1**: 429–38

Grice H P 1967 Logic and conversation. In: Grice H P 1989 *Studies in the Way of Words*. Harvard University Press, Cambridge, Massachusetts

Gruber J S 1965 Studies in lexical relations. In: Gruber J S 1976 *Lexical Structures in Syntax and Semantics*. North-Holland, Amsterdam

Harris R A 1993 *The Linguistics Wars*. Oxford University Press, Oxford

Jackendoff R S 1972 *Semantic Interpretation in Generative Grammar*. MIT Press, Cambridge, Massachusetts

Jespersen O 1937 *Analytic Syntax*. Allen & Unwin, London

Katz J J, Postal P M 1964 *An Integrated Theory of Linguistic Description*. MIT Press, Cambridge, Massachusetts

Kuhn T 1970 Postscript. *The Structure of a Scientific Revolution*, 2nd edn. University of Chicago Press, Chicago, Illinois

Lakatos I 1978 Falsification and the methodology of research programmes. In: Lakatos I, Musgrave A (eds.) *Criticism and the Growth of Knowledge*. Cambridge University Press, Cambridge

Lakoff G 1963 Toward generative semantics. In: McCawley J (ed.) 1976 *Notes from the Linguistic Underground* (*Syntax and Semantics*). Academic Press, New York

Lakoff G 1970a *Irregularity in Syntax*. Holt, Rinehart & Winston, New York

Lakoff G 1970b Global rules. *Language* **46**: 627–39

Lakoff G 1974 (interview conducted by H Parret). In: Parret H *Discussion Language*. Mouton, The Hague

Lakoff G 1987 *Women, Fire, and Dangerous Things*. University of Chicago Press, Chicago, Illinois

Laudan L 1976 *Progress and Its Problems*. University of California Press, Berkeley, California

Levi J N 1978 *The Syntax and Semantics of Complex Nominals*. Academic Press, New York

McCawley J D 1968a The role of semantics in a grammar. In: Bach E, Harms R T (eds.) 1968

McCawley J D 1968b Lexical insertion in a transformational grammar without deep structure. *Chicago Linguistic Society Papers* **4**: 71–80

McCawley J D 1971 Tense and time reference in English. In: Fillmore C, Langendoen D T (eds.) *Studies in Linguistic Semantics*. Holt, Rinehart & Winston, New York

McCawley J D 1975 Review of Chomsky 1972. *Studies in English Linguistics* **5**: 209–311

McCawley J D 1977 The nonexistence of syntactic categories. *Second Annual Metatheory Conference Proceedings*. Michigan State University, East Lansing, Michigan

McCawley J D 1978 Conversational implicature and the lexicon. In: Cole P (ed.) *Pragmatics* (Syntax and Semantics 9). Academic Press, New York

McCawley J D 1980 Review of 1st edn. of Newmeyer 1986. *Linguistics* **18**: 911–30

McCawley J D 1982 *Thirty Million Theories of Grammar*. Croom Helm, London

McCawley J D 1985 Kuhnian paradigms as systems of markedness conventions. In: Makkai A, Melby A (eds.) *Linguistics and Philosophy Studies in Honor of Rulon S. Wells*. Benjamins, Amsterdam

McCawley J D 1988 *The Syntactic Phenomena of English*, 2 vols. University of Chicago Press, Chicago, Illinois

Musgrave A 1976 Why did oxygen supplant phlogiston? Research programmes in the Chemical Revolution. In: Howson C (ed.) *Method and Appraisal in the Physical Sciences*. Cambridge University Press, Cambridge

Newmeyer F J 1986 *Linguistic Theory in America*, 2nd edn. Academic Press, Orlando, Florida

Postal P M 1974 *On Raising*. MIT Press, Cambridge, Massachusetts

Pullum G K, Wilson D 1977 Autonomous syntax and the analysis of auxiliaries. *Language* **53**: 741–88

Ross J R 1969 Auxiliaries as main verbs. *Studies in Philosophical Linguistics* **1**: 77–102

Ross J R 1970 On declarative sentences. In: Jacobs R, Rosenbaum P S (eds.) *Readings in English Transformational Grammar*. Ginn, Waltham, Massachusetts

Sadock J 1969 Hypersentences. *Paper in Linguistics* **1**: 283–371

Sadock J 1974 *Toward a Linguistic Theory of Speech Acts*. Academic Press, New York

Applicational Grammar

Jim Miller

In linguistics, as in all other areas of intellectual activity, ideas catch on not just because they are good but also because they arrive at the right time and in the right place. Developed at the wrong time and in the wrong place, Applicational Grammar (AG) is nonetheless a remarkable, if ultimately unsuccessful, achievement.

1. Background

AG, a type of generative categorial grammar, appeared when categorial grammar had few adherents among linguists. AG's theoretical isolation was increased by being written in Russian: when the English translation came out in 1971, Montague (1970a, b) had been published and Montague (1973) was already known to the specialists in the field. In the excitement of Montague Grammar, Shaumjan's work remained unnoticed, although, for example, his 1965 book proposes a way of handling complement clauses which anticipates Thomason (1976). Shaumjan (1977) is influenced by generative semantics and the lexical decomposition work of Fillmore but was novel in attempting to combine categorial grammar and what is now known as situation semantics.

The focus here is on Shaumjan (1965, 1971), because that model exhibits most clearly the properties distinguishing it from other generative models.

2. The Properties of Applicational Grammar

2.1 The Basic Units

The basic units are *term* and *sentence*, as is usual in categorial grammar. *Term* is represented by α, *sentence* by β. Other units, derived by combining the two basic ones, are interpreted thus: e.g., $\alpha\beta$—a unit or category applying to a term (α) to yield a sentence (β), i.e., a verb; $\alpha\alpha$—a category applying to a term to yield a term, e.g., an adjective; $\alpha\beta.\alpha\beta$—a category applying to a verb to yield a verb, e.g., an adverb; $\alpha\alpha.\alpha\alpha$—a category applying to an adjective to yield an adjective, e.g., an adverb such as *very*.

Shaumjan extends the categorial treatment to the structure of words, adopting Kuryłowicz's view that syntactic and morphological relations are parallel—e.g., that a change in syntactic function from predicate to attribute is paralleled by the change from finite verb to participle: *The child slept* vs. *the sleeping child* (examples are Russian and English).

He also accepts Kuryłowicz's view that different word classes have different primary and secondary functions. For adjectives, the modifying function is primary: they map terms into terms, and include more than the traditional adjectives. For instance, they include derivational affixes deriving nouns from nouns (or terms from terms)—*hood* in *childhood*, and the diminutive suffix *-ik* in Russian *domik* ('little house')—and nouns in the genitive case or with the English possessive affix. *Fiona's* added to *house* yields the term *Fiona's house*. In Russian, a noun in the genitive case—e.g., *studenta* ('of the student')—combines with a noun in the nominative case—e.g., *kniga studenta* ('the book-of the student')—to yield a term. This is a secondary function of the noun *student*, which is signaled by the genitive case. The primary function of nouns is to be a basic term to which verbs apply to yield sentences. This function is signaled by the Russian nominative case.

Other items belonging to the category adjective are prepositional phrases—*about gardening* combines with the term *books* to yield the term *books about gardening*—and participles, such as English *sleeping* from *sleep* and Russian *igrajushchij* ('playing') from the stem *igra-*. The primary function of verbs is to apply to a noun to yield a sentence. One secondary function is to act as an adjective, which is signaled by the participial suffix.

2.2 Derivations

Combinations of items are generated by a single operation called 'application'—whence the title 'applicational grammar.' Application, from Curry's work—cf. Curry (1963), involves an operator applied to an operand. The notation—typical categorial notation—indicates, for a given case, the operator, the operand and the result of the application. Thus, for the item $\alpha\beta$, β labels the category of the operator, α labels the category of the operand and $\alpha\beta$ labels the category into which the operand is mapped. Suffice it to say here that the derivational system is rigorously defined, with a set of primitives and a rule for deriving new items from the primitives or from other derived items.

2.3 Different Levels of Category

To treat *Fiona*'s, etc. merely as instances of a general category $\alpha\alpha$ would be to ignore differences between them: *igrajushchij* derives from a verb, *studenta* is a noun in the genitive and *about gardening* is a prepositional phrase. Moreover, *-ik* in *domik* and *-a* in *studenta* are part of the internal structure of words. Another problem, as mentioned in Sect. 2.1, is that while being an adjective is the primary function for, e.g., *small*, it is a secondary function for the participle *igrajushchij*.

AG solves these difficulties by having a top level of 'episemions,' the general categories presented in Sect. 2.1, and a lower level of 'semions,' which are narrower categories in that a given semion has a structure showing its derivation. Shaumjan captures that structure by means of a 'relator notation' and language (one possible actual 'calculus' of semions).

2.4 Relators: Derivational Morphology and Syntactic Function

There are five relators, R_1 to R_5. R_1 represents the category $\alpha\beta$, $R_2-\alpha$, $R_3-\alpha\alpha$, $R_4-\alpha\beta.\alpha\beta$, and $R_5-\alpha\alpha.\alpha\alpha$. They apply to an empty root 0, or to any combination of relators and 0, or to an entire phrase, i.e., to some sequence of R_n0s. If 0 is the root *uch-*, R_1 applies to yield R_10, corresponding to finite forms of the verb: *uchit* ('teaches'), *uchim* ('we teach'), etc. In turn, R_2 applies to R_10 to yield R_2R_10, corresponding to nouns derived from the verbal stem, such as *uchenie* ('teaching') and *uchitel'* ('teacher').

The sequences of relators correspond to stages in the derivational morphology of a given word. If 0 is *zim-*, R_2 applies to yield R_20—*zima* ('winter'). R_1 applies, yielding R_1R_20, corresponding to a finite verb form—say, *zimuem* ('we pass the winter (somewhere)'). R_2 applies to yield $R_2R_1R_20$, corresponding to *zimovka* ('the act of wintering'), and the formula corresponding to *zimovochnyj* ('winter' as in 'winter quarters') is derived by applying R_3 to yield $R_3R_2R_1R_20$.

Unlike the last Russian example, *winter* can be noun, verb or adjective without derivational affixes. Nonetheless, the adjective *winter* in *winter quarters* would correspond to the formula $R_3R_2R_1R_20$, R_3 signaling its modifying function.

Russian has various cases. Only nouns in the nominative case correspond to R_2, because only they combine with a verb to form a sentence. Nouns in the genitive case correspond to R_3, because they have an adjective function: they map terms onto terms. Nouns in other cases correspond to R_4, because they map verbs onto verbs: the accusative case form *kartu* ('map') combines with *chitaet* ('reads') to yield *chitaet kartu*, which combines with the nominative noun *soldat* ('soldier') to yield the sentence *Soldat chitaet kartu* ('The soldier reads the map'). English has no case, but nouns do have different syntactic functions and correspond to different formulae: in *The soldier is reading the map*, *the map* is R_4 because it maps the verb *is reading* into the verb *is reading the map*, and the *soldier* corresponds to R_2 because it combines with that verb to yield a sentence.

2.5 Other Primitives in the Relator Calculus

In addition to relators and 0, the relator calculus has 'adnectors,' 'connectors,' and 'propositors.' Adnectors are identity elements interpretable as, e.g., negation and interrogation, which apply to a given linguistic element leaving it identical with itself. Connectors correspond to conjunctions such as *i* ('and'). Propositors convert phrases and clauses into the *determiners* of clauses. Thus, *if* converts the clause *it is raining* into a subordinate clause acting as determiner to another clause: *If it is raining, I am going to stay at home*. The phrase *according to the instructions* can function as an R_4 in, e.g., *We prepared the vegetables* *according to the instructions*; it can function as a determiner of a clause, as in *According to the instructions, you were to wait there till help arrived.* Subordinating conjunctions such as *if* always function as propositors, whereas phrases such as *according to the instructions* may or may not function as a propositor.

3. Sentences and Transformational Fields

0 with one or more relators corresponds to a word in English or Russian. In turn, an element R_n0 can apply to another R_n0 to create a more complex element. R_30 applied to R_20 generates R_30R_20, which can be interpreted as *splendid parties.* As it stands, R_30R_20 cannot be interpreted as having any particular syntactic function, but the relator R_4 can be applied to generate $\|R_4|\ R_30R_20$, i.e., an $\alpha\beta.\alpha\beta$ mapping a verb onto a verb. $\|R_4|R_30R_20$ applies to an R_1 item, say R_10 to generate $\|R_4|R_30R_20R_10$, interpretable as *gives splendid parties.* The above sequence, an instance of $\alpha\beta$, maps a term into a sentence, applying, say, to R_20, to generate $\|R_4|R_30R_20R_10R_20$—*Gatsby gives splendid parties.*

AG can generate, quite independently of each other, the 'analogs' of *Gatsby ruined that party* and *That party was ruined by Gatsby*. In the relator analog of the active sentence *Gatsby* corresponds to R_20, a term looking for a verb to map it into a sentence. In the analog of the passive sentence, *Gatsby* corresponds to R_4R_20, an item mapping a verb into a verb. These remarks apply, vice versa, to *that party.*

3.1 Transformational Fields

Generative grammar expresses relationships between different constructions, but the independent analogs of active and passive sentences do not. To overcome this defect, AG generates the analogs of sets of sentences by means of graphs.

Down the left-hand side of a given graph are the relators, ordered from top to bottom in the sequence R_5, R_3, R_2, R_1, R_4. This order reflects possible applications: an R_5 item applies to an R_3 item, an R_4 item to an R_1 item, and so on. Across the top of the graph is the expression to be transformed, the 'base,' which can be the analog of a sentence or the analog of a phrase. Each relator is applied to each R_n0 in the expression across the top of the graph and the result is written in the column below the R_n0.

The set of R_n0s generated constitutes a 'transformational field,' represented by a graph with the R_n0s arranged in columns and rows. Two restrictions can be placed on the generative process: (a) the graph is connected; (b) head-modifier links between items in the base expression are preserved in the derived expressions. If (a) and (b) are both imposed, the transformational field is *bound*; if (a) alone is imposed, the field is *semi-bound*; if neither is imposed, the field is *free.* (NB: Head-modifier links relate to phrases only: the subject–predicate link is not one of head and modifier.)

For example, if the base is $R_30\ R_20$—*striking beauty*, one transform is $R_5R_30\ R_3R_20$—*strikingly beautiful*, which maintains the head-modifier links. Suppose that the base is $R_20\ R_10\ R_4R_20$—*The train arrived from Moscow.* One transform is $R_3R_4R_20\ R_2R_20\ R_1R_10$—*The Moscow train arrived. From Moscow* is a modifier of the verb in the base expression, but a modifier of the subject noun in the transform: i.e., the head-modifier links are altered.

The base can be a more complex expression, say $\|R_2|R_30R_20$ (*imaginative students*) R_10 (*write*) $\|R_4|R_30\ R_20$ (*interesting essays*). The initial R_2 applies to the adjective–noun block, and the R_4 applies to the final adjective–noun block. The graph generates, inter alia, $R_4\|R_2|R_30\ R_20\ R_1R_10\ R_2\|R_4|R_30\ R_20$, which is the analog of *Interesting essays are written by imaginative students.*

4. Genotype and Phenotype Grammars

The model described above is a 'genotype' grammar; i.e., a grammar handling the generic properties of language. The sequences of semions are mapped onto sequences of, e.g., Russian, English, or Georgian morphs by 'phenotype' grammars which assign word order, morphological categories and phonological shape.

5. The Later Model

Shaumjan (1977) extends the model to semantics. The derivational apparatus is essentially the same, but the relator genotype language represents the analog of semantic structures: the relators correspond to the relations of 'predicate logic,' with the restriction that they are all 'two-place' in the axioms. The axioms belong to the category β, i.e., are sentences, and correspond to components of situation models.

The situation models are 'localist,' that is, based on the assumption that the semantic representation of any situation has as its central components a predicate of location or movement, the case relations of location, movement from or movement to, and the case relation 'objective,' which corresponds to the entity conceived of as being located somewhere or moving somewhere. For instance, *Fiona gave Bill his essay* is derived from a semantic structure which has an event coming from Fiona—represented by a 'two-place predicate'—and the event is the essay coming-to-be-located at Bill, which event is also represented by a two-place predicate.

The axioms state the possible relationships between entities: $R_{oa}T^1T^2$ represents a 'two-place relator,' and the two terms correspond to two entities, one of which moves away from the other. The subscript letters on R represent the case relations and at one stage in the derivation are copied onto the terms. The order is important, since it indicates that the *theme* is ablative and the *rheme* objective: that is, the entity from which the other entity moves away corresponds to the surface subject, and the other entity is in the rheme of the surface sentence. For example, R might correspond to *sent*, T^1_a to *Bill*, T^2_o to *telegram*, and the whole axiom to *Bill sent a telegram*. In contrast, $R_{ao}T^1T^2$ corresponds to *A telegram was sent by Bill*.

Rules of derivation generate surface sentences from the sequence of semions representing the semantic structure. One semion, B, triggers the fusion of semions: e.g., the mapping of *cause-be-located* into the single lexical item GIVE. Another semion, labeled C, causes terms to be permuted, as in the derivation of the relator expression corresponding to *They loaded the barges with timber* from the relator expression corresponding to *They loaded timber on the barges*. The reordering rules with C, like the matrix graphs in the 1965 model, express relations among different constructions.

As in the 1965 AG, once relators and terms have been fused and ordered, a phenotype grammar maps the expressions onto sentences of a given language. The phenotype mappings are organized around particular groups of lexical items. For instance, the general lexeme GIVE$_{ola}$ is a cover term for verbs with a particular valency, such that the theme term corresponds to the giver, the second term (here the direct object)—to the person at whom something comes to be located, and the third term—to the entity that moves, i.e., GIVE$_{ola}$ is a cover term for Z EQUIP X WITH Y, Z PROVIDE X WITH Y, Z PRESENT X WITH Y, Z REWARD X WITH Y, and so on. Each group of lexical items has its own order of nouns, its own prepositions and, for Russian, its own case endings. The valency is crucial: an item with two valencies—Z PRESENT X WITH Y and Z PRESENT Y TO X—is treated in the phenotype grammar as two different items, although the two valencies correspond to one item in the genotype grammar. The corresponding basic relator in the genotype grammar is R_{loa} (Z PRESENT Y TO X), but the order of terms is changed by a derivational rule with C. Even passives and constructions with reflexive verbs (in Russian) are derived by rules with C.

6. A Critique of Applicational Grammar

Like the classical transformational model, the 1965 AG model focuses on syntax while the 1977 model, possibly reflecting generative semantics of the late 1960s, maps semantic expressions onto surface sequences where morphological categories are much in evidence but syntax is absent.

The 1965 model was to contribute to grammatical synonymy and to typology. Given a base expression and the expressions derived from it, two properties could be measured: within a single language, the degree of synonymy between any two of the derived expressions could be measured by the number of subexpressions they shared; with respect to typology, any two languages could be compared according to which derived formulas are interpretable in both languages and which only in one.

Although AG is remarkable for its rigor and formal consistency, the claim concerning typology highlights a fundamental weakness. The elementary semions are based on certain characteristics of natural languages, but the derivational procedure was devised by Curry to generate completely abstract uninterpreted objects capable of being put in correspondence with any appropriate entities, linguistic or mathematical or whatever. The derivational procedure is defined with great rigor, but, apart from the basic combinatory possibilities, is so remote from natural language that the advantages of the model are outweighed by its limited scope. Offering little for dependency relations and nothing for constituent structure, AG is irrelevant to language acquisition and to typological studies of dependency relations, the order of heads and modifiers, the question of flat vs. hierarchical constituent structure, and the question of clause-embedding vs. clause-chaining.

AG reflects a fundamental tension in formal linguistics: the difficulty of developing a formally rigorous model that expresses interesting and exploitable hypotheses about linguistic structure. Formal rigor comes with systems borrowed from metamathematics, and Shaumjan adopts the notion of a metalanguage formulated so precisely that its reasonings could be seen as derivations according to precise rules, whose correctness of application can be seen by inspecting the symbols of the metalanguage regardless of any meaning they might have. The trouble is that, outside mathematics, the axioms of a given system must have a degree of truth or falsity with respect to a given subject-matter, and a degree of interest. Shaumjan's axioms are true insofar as his categories are not without linguistic support. There is formal rigor in plenty, but in linguistic theory and its major applications the axioms have hitherto failed to arouse excitement.

Bibliography

Curry H B 1963 *Foundations of Mathematical Logic*. McGraw–Hill, New York

Montague R 1970a English as a formal language. In: Visentini B (ed.) *Linguaggi nella Societa e nella Tecnica*. Edizioni di Communita, Milan

Montague R 1970b Universal grammar. *Theoria* **36**: 373–98

Montague R 1973 The proper treatment of quantification in ordinary English. In: Hintikka J, Moravscik J, Suppes P (eds.) *Approaches to Natural Language*. D Reidel, Dordrecht

Partee B H 1976 *Montague Grammar*. Academic Press, New York

Shaumjan S K 1965 *Strukturnaja Lingvistika*. Nauka, Moscow (Transl. by Miller J 1971)

Shaumjan S K 1971 *Principles of Structural Linguistics*. Mouton, The Hague

Shaumjan S K 1977 *Applicational Grammar as a Semantic Theory of Natural Language*. Edinburgh University Press, Edinburgh (Transl. by Miller J)

Thomason R 1976 Some extensions of Montague grammar. In: Partee 1976 *Montague Grammar*. Academic Press, New York

Case Grammar

John M. Anderson

'Case grammar' (CG) is a label used for various developments in grammatical theory originating in the mid-to-late 1960s which are associated more or less closely with a certain hypothesis concerning the organization of the grammar: the hypothesis concerns the status of semantic functions—or relations or roles—such as agentive or locative; functions which label the mode of participation of the denotata of arguments in the situation described by the predication in which they occur. The terms 'various' and 'more or less closely' are used advisedly. Since case grammar is a partial hypothesis, it is compatible with a variety of hypotheses concerning other aspects of the grammar, though it will, of course, interact with them. Since, too, the hypothesis can be formulated in more and less strong forms, not all variants of case grammar are as distinct in their claims from what is embodied in other frameworks which are not usually termed case grammars. The minimum case grammar hypothesis is that semantic functions are relevant to the expression of syntactic (as well as semantic) generalizations; in a stronger, more interesting form it involves the claim that they are basic to the syntax, and that many other aspects of syntactic structure are derivative of them.

The name itself is in part a recognition that what is involved is, again in part, a return to traditional concerns with the semantics and syntax of case, concerns which were neglected by structuralist (including early transformational) frameworks which abolished the morphology/syntax division and were reticent about semantics. The term case grammar specifically devolves from Fillmore's (1965, 1966, 1968a) use of case relation, or simply case, for semantic function, the status of which is fundamental to the case grammar hypothesis. Section 1 outlines some of the basic notions central to the main tradition associated with this hypothesis, while sects. 2 and 3 give some idea of, respectively, the variety of interpretation to which it has been subjected and the range of attempts to arrive at a definition of case and cases.

1. Some Fundamentals

The use of the term 'case relation' for semantic function is based on the familiar observation that in a number of languages semantic functions are distinguished by differences in nominal inflection, as in the Old English sentence of (1):

Him ofhreow ðæs mannes (1)
He/they + DAT pitied the + GEN man + GEN

wherein the dative inflection signals the locus of the emotion denoted by the verb (discussed below as the experiencer case relation) and the genitive inflection marks the source of the emotion. However, it must be acknowledged, as is once more familiar from earlier studies (cf. Welte 1987), that in many instances the correlation between case inflection and semantic function is not simple. Most notoriously, case inflections can correlate more closely with grammatical functions or relations. Notably, most grammarians would not include subject among the set of semantic functions. At the very least, it is of a rather different character from agentive, etc.; hence its differentiation, along with object, etc., as a 'grammatical relation.' But the inflections identified by the label nominative in various languages are labeled thus precisely because their occurrence correlates most closely with the nominal identified on other grounds as a subject. Further, apart from the fact that case inflections typically express other categories simultaneously with case (or grammatical) relations, categories such as gender, number, dimensionality, distinctions in case relation are frequently expressed otherwise than by nominal inflection. Typically, as well as, or instead of, noun inflections, adpositions, verbal auxiliaries, word order, verb morphology, and combinations of these may be involved, often in combination in the same language. Consider, for example, the sentences from eastern Pomo in (2):

mî·p̓ bé·kal duléya 'he them killed' (2a)

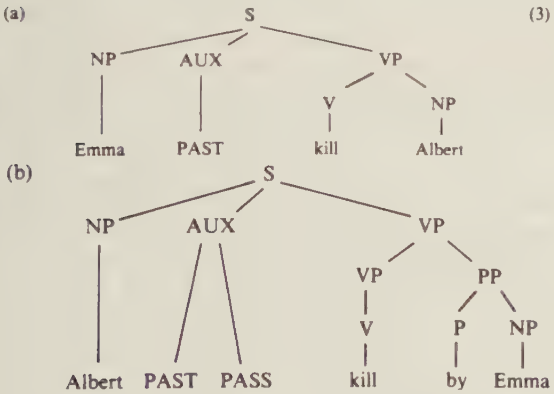
bé·kʰ mí·pal ša·k̓akiya 'they him killed' (2b)

mí·p̓ kaluhuya 'he went-home' (2c)

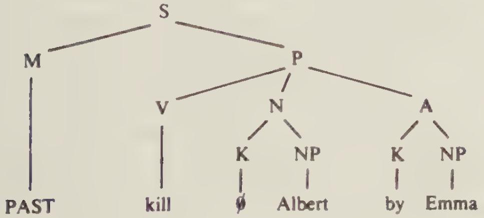
bé·kʰ kálpʰi·líya 'they went-home' (2d)

bé·kal c̓e·xélka 'they slipped.' (2e)

The shape of the pronoun reflects whether it is agentive or not: *mí·p̓* and *bé·kʰ* are agentive, they mark the source of the action, both in the transitive examples (2a–b) and the intransitive (2c–d); but *mí*ˑpal and *béˑkal* signal the entity undergoing the action or process, what will be described below as an instance of the neutral case relation, both in the transitive examples (2a–b) and in the intransitive (2e). Typically, too, the suppletion illustrated in (2a/b)—the 'kill' verb changes its shape—is in response to the number of the neutral ('them' versus 'him'). However, in (2c/d) the (partial) suppletion is triggered by the number of the argument already (on the basis of the correlation between semantic function and pronoun morphology) labeled agentive. This would seem to confirm that the pronouns in (2c) and (2d) are simultaneously agentive and neutral, as both source of the action and undergoer of the action (of movement), whereas that in (2e) is neutral simply. We return to the association between argument and case relation in Sect. 3; what is most relevant at this point is the interaction of different means of expressing case relations illustrated in (2). There is typically too, with respect to a specific language, no one-to-one correlation between particular case relation and particular expression, whether by inflection, adposition, or whatever. Despite occasional claims to the contrary, the English preposition *by*, for instance, is not associated uniquely with agentives, or *to* with goals: both can also mark what is often labeled experiencer (*known by/to*). Nevertheless, given that the expression of distinctions in case relation may be regarded as the prototypical function of case inflections, this terminology is not unjustified. And its appropriateness is reinforced to the extent that grammatical relations can be regarded as neutralized case relations.



(3)



(4)

Such a notion is crucial to the strong case grammar framework developed by Fillmore in the late 1960s. This substituted for the deep structure of a grammar of the type envisaged in Chomsky (1965) basic representations including nodes associated with a set of case relations. Both surface structures of (3), for example are derived from the (unordered) deep (case) structure of (4). The proposition consists of a verb and a set of case phrases, each of which includes a case 'flag' (kasus) and a noun phrase. The agentive is the source of the action; the neutral is the least specific case, whose precise relation to the predicate is most obviously dependent on the type of the predicate: it labels the entity which undergoes processes and movements and actions and has locations and states attributed to it. Section 3 discusses more fully the definition of the cases; but notice at this point that n(eutral) appears under a number of different labelings—ergative (an acknowledged misnomer), object(ive), nominative (again, unfortunate), absolutive, patient (usually interpreted more narrowly than neutral). Modality consists of elements of tense, mood, and aspect, including modal cases (such as manner phrases), which are interpreted as modalities of the sentence as a whole. Predicates, such as the verb in (3/4), are subcategorized not in terms of their functionally unlabeled couplements but with respect to the set of case phrases they require, obligatorily, or optionally, as exemplified in (5):

+[——N(eutral) A(gentive)] (5a)

+[——N (A)] (5b)

The verb of (5a) (perhaps *kill*, if one ignores instrumentals, such as *with a handbag*, for the moment: see again Sect. 3) is marked as taking a neutral and an agentive. That in (2b) takes an N and an optional A, perhaps appropriate for *melt*: see (8) below.

Assignment of the status of subject, for example, is based on the set of case phrases present in a sentence, the case frame. Each entry in (5) includes a set of case frame features. Unmarked assignment in a particular predication is specifically in accord with a hierarchy of case relations, as exemplified by (6) (Fillmore 1968a):

Agentive < Instrumental < Objective (6)

such that an agentive, if present, will be subject; in the absence of an A, then an instrumental, if present, will be; and so on. With *kill* the agentive takes priority, as in (3a). The surface structure of the passive sentence in (3b) contains signals (the auxiliary construction) that here the hierarchy has been overridden, a marked selection of subject has been made, and the 'rejected' subject is distinguished by an appropriate marker (here *by*). There has been some controversy over the character of the hierarchy, partly as a result of different views concerning the set of cases, as discussed in Sect. 3 below. It may be too that lexical exceptions to the hierarchy have to be acknowledged. For instance, if *like* and *please* in English are associated with the same set of case frame features, then one of them will have to be marked as exceptional in subject selection:

Jemima liked the play (7a)

The play pleased Jemima (7b)

whatever the hierarchy, if it is determinate. Anderson (1977: § 2.1.5) and others have denied that this is necessary, in that the two verbs require different sets. But even if such exceptions have to be countenanced, the viability of some such hierarchy is the basis for the strong case grammar hypothesis, which asserts the basicness of cases and the dependence thereon of other syntactic phenomena (including subject selection).

It has been argued too that conventional deep structures, as well as being derivable, also form a poor basis from which to project (deep) grammatical relations, one of their claimed roles: configurational definitions are difficult to maintain across languages; they allow for spurious (or at least never utilized) grammatical relations; and some categories seem themselves to be relational (e.g., 'place'). And the role of deep relations in the grammar (*pace* Katz 1972) remains obscure. (See here, for example, Anderson 1977: § 1.2, 1982; Starosta 1987.) And, the argument proceeds, neither deep structures nor grammatical relations are relevant to lexical relationships.

Fillmore's work throughout has involved a strong interest in lexical semantics (see particularly Fillmore 1987; also, in the present context, 1968b, 1970, 1971b, c, 1972, 1977a, b). And much effort within case grammar has been devoted to showing that subcategorization and lexical relations are sensitive to case relations rather than the configurations and grammatical relations that are derivative in CG. So-called 'ergative' verbs (Lyons 1968) provide a straightforward example with respect to subcategorization. Case grammarians have argued that the basic distributional potential of verbs like that in (8):

Burt melted the ice (8a)

The ice melted (8b)

is most transparently described in terms of the case features of (9):

____N (A) (9)

rather than, say, the conventional frame of (10):

(+[____NP]) (10)

which obscures what is constant in the two basic occurrences, the neutral (objective) argument, with selection of subject being determined by the hierarchy. Anderson (1984) attempts to show that a wide range of (lexical) derivational relationships in English make no reference to grammatical relations or the configurations in terms of which they may be defined. Typical here is *-able-* formation, whose central function is to form adjectives of a certain semantic character on the basis of verbs, such that the argument of the adjective corresponds to the neutral argument of the verb (whatever its grammatical relation); there is again the familiar 'ergative' relation, illustrated in (11):

The cover is removable. (cf. Beppo has removed the cover) (11a)
The settings are changable. (cf. Beppo has changed the settings)

The material is perishable. (cf. The material has perished) (11b)

The weather is changable. (cf. The weather has changed)

and highlighted therein by the derivational pattern associated with a verb like *change*. And reference to grammatical relations again obscures the generalization. The import of this is that if the lexicon (via subcategorization and derivational relationships) has access only to basic syntactic structure, then grammatical relations and the division into subject and objects do not appear to be basic: this is exactly what is claimed by the case grammar hypothesis.

This conclusion can be avoided, with respect to examples like (8) and (11), at least, if there is adopted the unaccusative hypothesis associated with developments in relational grammar and other frameworks. In terms of this hypothesis, the surface subjects of (8a) and (11a) are initial direct objects; their subjecthood is derivative only. (Other intransitive verbs (typically agentive) do have initial subjects; they are unergative.) The relationship in (8) and (11) can then be described without reference to case relations: for example, 'ergative' verbs are transitives with an optionally empty subject; the derivational relationship illustrated by (11) involves uniformly the direct object of the base verb. Case grammarians have argued that such a strategy lacks independent motivation, is unnecessary given the availability of case relations, and leads to incorrect predictions (cf. Anderson 1980).

Such arguments have also been concerned to show not only that grammatical relations are derivative but also that it is inappropriate to attribute subjecthood at all to certain language types, if a definition of subject more restrictive than 'obligatory derived relation' is to be maintained. In most languages, subject is a syntactically motivated grouping (or neutralization) of (whatever else) transitive agentives and intransitive neutrals (cf. (8) again); in the ('ergative') Dyirbal language of Australia such a grouping is at most only marginally relevant syntactically. (Direct) objecthood is also notoriously difficult to identify. Finally with respect to grammatical relations, it has also been argued that indirect object is an incoherent relation, even derivatively (Anderson 1978).

Throughout the late 1960s and the early 1970s, various different versions of CG were proposed, to some extent independently (e.g., apart from the work of Fillmore: Anderson 1968, 1971; Platt 1971; Cook 1971, 1972a, b, 1973, 1978; Nilsen 1972; Longacre 1976; also Chafe 1970); and the framework inspired a number of descriptive and applied studies. However, little agreement on the set and nature of the set of case relations emerged (see further Sect. 3). And it became clear that case grammar was vulnerable to the charge that, apart from the claimed prediction of the distribution of grammatical relations and associated word order properties, little evidence of a syntactic role for case relations was adduced. Thus, for example, the case-based lexicon of Stockwell et al. (1973) plays almost no role in the syntactic descriptions that occupy the rest of the volume. Even more seriously, perhaps, evidence was put forward, on the other hand, for the semantic and syntactic relevance of deep grammatical relations and for the necessity of positing the kind of relation between active and passive sentences prescribed by the passive transformation, which was eliminated from the syntax by Fillmore's (1968a) proposals. Crucial here is the discussion of the role of grammatical relations by S. R. Anderson (1971).

Pairs of sentences such as that in (12):

Ernie loaded the pickup with packs of amaretti (12a)

Ernie loaded packs of amaretti onto the truck (12b)

differ in interpretation: the former has been described as 'holistic,' the action exhausts the relevant dimensions of space denoted by the direct object; the latter is 'partitive.' If (12a) and (b) share case features (say 'agentive, neutral, place'), then the basis for the difference must be located elsewhere. It is not a property of surface structure; the difference remains constant under various transformational movements, as illustrated by (13):

The pickup was loaded with packs of amaretti (13a)

Packs of amaretti were loaded onto the truck (13b)

and (14):

It was packs of amaretti that Ernie loaded the truck with (14a)
It was the pickup that Ernie loaded with packs of amaretti

It was packs of amaretti that Ernie loaded onto the pickup (14b)
It was the pickup that Ernie loaded packs of amaretti onto

What the (12–14a) variants share is deep structure association of the place case relation with direct object function. Their derivations must include a stage at which this association is made, motivating both passive as a transformation and deep object. (This is, of course, not to deny that, given appropriate assumptions, this association could be read off derived structures.)

Fillmore (1977a) concedes the force of this argument, and essentially reinstates deep structure, thereby effectively abandoning the case grammar hypothesis in its strongest form. Others have disagreed. It is possible, for instance, that passive may be accommodated constructionally, as biclausal (see Sect. 2). But even if that possibility is laid aside, it can be argued that the case feature assignments assumed above are inappropriate, that they differ between the (a) and (b) examples. Miller (1985) suggests that the association of argument to case relation is reversed between (12a) and (12b); J. M. Anderson (1977: § 1.8) accepts that the (a) and (b) examples share the same case features and the same associations, but suggests that in addition the place argument in the (a) examples is simultaneously neutral: i.e., it bears two case relations. (On this see Sect. 3.) Under either proposal, holisticness, as elsewhere, can be associated with the neutral case relation: unless this expectation is canceled in some way, neutrals are normally understood as participating as a whole in the process being represented. This is true of the neutrals in (8a) and (8b), for instance. J. M. Anderson also points out that the generalization based on deep object is inadequate. The subject place argument in (12c) is also associated with a holistic interpretation:

The garden is swarming with bees (12c)
Bees are swarming in the garden (12d)

He attributes this to the place in (12c) being again simultaneously neutral, which is also associated with its selection as subject. Once more, (12a) and (12c) show the 'ergative' pattern that cuts across grammatical relations.

The syntactic role of case relations has been variously addressed since the mid-1970s. The force of objections based on the paucity of reference by transformations to case relations has been considerably weakened by the apparent demise of individual transformations. For instance, the motivations for a syntactic relationship between pairs such as that in (15):

Anna taught Helen Greek (15a)

Anna taught Greek to Helen (15b)

involving a putative dative movement, are disputable, where evident. These pairs can be argued to show a partially shared case frame, with the difference in word order being attributable to the differences in case relations present (cf. again Anderson 1978; also 1987; Böhm 1986). The difference in case frame is reflected in the contrary acceptabilities of (16a) and (b):

*Anna taught an empty room Greek (16a)

Anna taught Greek to an empty room (16b)

The *Helen/empty room* argument is involved in the action in a different way in the (a) and (b) examples, suggesting a difference in case relation.

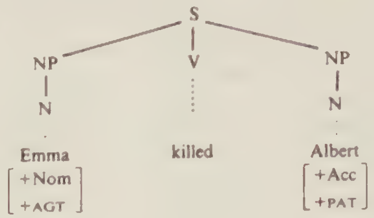
More generally, the development of frameworks in which transformations are reduced to a small number, including one, or from which they are eliminated altogether, poses the question of the syntactic relevance of case relations in a different way—or rather different possible ways. This is one respect in which different variants of case grammar have evolved in response to decisions about other aspects of the grammar than are encompassed by the basic case grammar hypothesis.

2. Varieties of Case Grammar

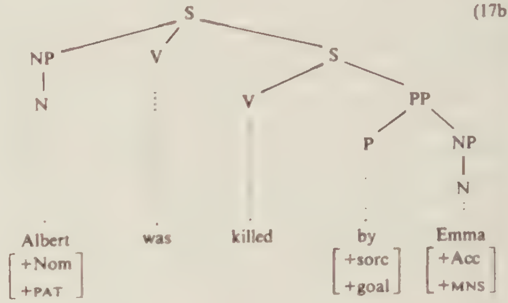
Fillmorean case grammar evolved as an alternative to the kind of transformational grammar expounded in Chomsky (1965), with subject-formation as one of a number of transformational rules. Anderson (1968, 1971) talks of rules of realization (including 'sequencing'), implying nontransformational mapping of (unordered) case structures onto surface structures enriched with sequence and configurations; but only a very limited range of constructions is taken into consideration. And Anderson (1977) envisages complex (transformational) derivational relationships between initial structures and surface, including prelexical application of syntactic rules (see *Generative Semantics*).

Partly in reaction to such developments, Starosta (1973, 1978, 1987, 1988) and others have formulated a framework, lexicase, which eschews transformations, and, indeed, syntactic derivations altogether. Syntax is monostratal and case relations and case forms (including case inflections) are marked as features on lexical items, the former on nouns, the latter on nouns, verbs and prepositions. Thus, corresponding to (3) and (4) above one might have (17), with no deep-/surface distinction. AGT and PAT, are case relation features, roughly corresponding to A and N; nom, acc, sorc, and goal are case form features. The relationship between the [+AGT] noun in (17a) and the means ([+MNS]) noun in (17b) is expressed by the rule of lexical derivation which forms the adjectival verb in (17b) from the transitive verb in (17a). Corresponding to the case frame features discussed above are contextual features such as [+[+AGT]] and [+[+PAT]] associated lexically with predicates. Contextual features may be either inherent or given by lexical redundancy: e.g., all verbs are redundantly [+[×PAT]] (what Starosta refers to as patient centrality: see Sect. 3).The subject selection hierarchy is also expressed by lexical redundancies such as (18), which requires that an item that occurs with a [+AGT] must also occur with a [+PAT] (generalizable as patient centrality), and also that the [×ACT] is [+nom], subject, and the [+PAT] is [+acc], object. In general the grammar is reduced to what can be expressed via relationships between individual lexical items—though the status of long distance dependencies remains uncertain. It should be noted too that some critics have found it difficult to see how basic word order settings (such as head-modifier versus modifier-head) can be regarded as part of the lexicon.

(a) (17a)



(b) (17b)



It is still possible within such a restrictive framework to reconstruct the fundamental basis for the case grammar hypothesis, the primacy of case relations vis-à-vis case forms; specifically, in terms of redundancies like that in (18). But lexical primacy of case relations is a property shared by a number of other proposals, such as those made within the tradition of functional grammar, as developed by Dik (1978; also 1987) and others. Are these also case grammars? Starosta himself describes various valency grammars as such. This is to some extent a terminological matter. However, the central thrust of work in case grammar (what was called above the strong hypothesis) has involved the *syntactic* primacy of case relations and the exclusion of grammatical relations, etc., from the lexicon (cf. Sect. 1 above). Other developments suggest that this can be maintained within a restrictive theory that does not abandon the syntax/lexicon division.

$$[+[+\text{AGT}]] \rightarrow \begin{bmatrix} +[+\text{PAT}] \\ -\begin{bmatrix} +\text{nom} \\ +\text{AGT} \end{bmatrix} \\ -\begin{bmatrix} +\text{acc} \\ +\text{PAT} \end{bmatrix} \end{bmatrix} \qquad (18)$$

The descriptions proposed by Anderson (1977) involve complex syntactic derivations. But they are conceived of as resulting from the interaction of a small number of universal syntactic rules, and possibly only one involving structure change (raising), regulated by universal constraints, such as strict cyclicity. Roughly, in terms of this last, cyclic structure-changing rules must apply only in derived (non-monoclausal) environments or in an environment resulting from the application of a cyclic rule. Thus, a derivation whereby the subject of the finite verb in (19):

Fran seems to like cheese (19)

is raised out of a subordinate clause, conforms to strict cyclicity, whereas monoclausal rules like dative and the traditional passive, whether interpreted as movements or relation-changes, are illegitimate. Such a requirement outlaws all the advancements of relational grammar, for instance, if conceived in derivational terms. Raising, indeed, it has been argued (e.g., Anderson 1982, 1984, 1986), provides a paradigm instance of the syntactic role of case relations and of the appropriateness of the strong case grammar hypothesis.

In (19) the raised subject of the (nonfinite) subordinate clause assumes the subject function in the main (cyclic) clause. In (20):

Nobody expected Fran to like cheese (20)

the raised subject becomes the object of the finite verb. (Such a formulation clearly rejects attempts to deny such a (derived) status to the *Fran* argument in (20).) The derived relations involved present us with a familiar pattern of distribution, that labeled 'ergative.' The status of subject in (19) and object in (20) is exactly what one would expect of a neutral argument; in (20) it is denied subjecthood by the experiencer argument of the finite verb. Raising confers the neutral case relation in the cyclic clause on the subject argument of the subordinate verb. Formulations of raising invoking grammatical relations or configurations, once again, obscure this generalization. More interestingly still, this interaction of relations is as predicted by the case grammar hypothesis. The identification of grammatical relations is derived, determined by the hierarchy; thus, the identity of the subject of the cyclic clause is not available on the cycle of rules applying to that clause (in the absence of an arbitrary ordering of rules); but, if the subject is identified cyclically, then its identity is available on the next cycle. This is exactly what the formulation of raising requires: the argument involved is identified as the subject of the lower clause (now available, on the raising cycle) and as neutral (a case relation) in the cyclic clause; its grammatical relation in the upper clause is given by the hierarchy. Indeed, if this argument had to be identified in the formulation of raising by its grammatical relation in the cyclic clause, such a formulation would stand as a counterexample to the predictions of the case grammar hypothesis.

Dative and passive, insofar as they involve manipulation of derived properties within a single clause, also violate the case grammar hypothesis, as they do strict cyclicity. The two hypotheses converge in excluding them as monoclausal rules. The dative relationship with examples like (15) can be allowed for in terms of partially shared case features. Such an account is not available, however, for passive. But as an alternative to the lexical proposal described above, a cue can be taken from the overtly two-verb structure involved. Say (passive) *be* is a raising verb, and its subject is raised out of the subordinate clause associated with the accompanying nonfinite (e.g., Anderson 1990, 1991, 1992: § 4.1). It differs from a raising verb like *seem* only in that the raised argument is not the subject of the nonfinite verb; rather, it is the argument next down on the subject selection hierarchy. This stipulation allows for all of (21):

Albert was [killed by Emma] (21a)

That was [known by/to everybody] (21b)

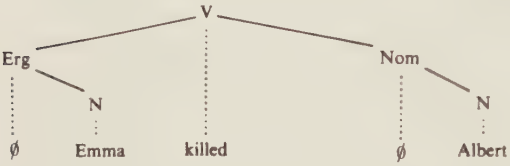
The bed was [slept in by a parrot] (21c)

(with the boundaries of the subordinate clause marked by brackets). In each instance the hierarchically highest argument (agentive, experiencer, agentive/neutral, respectively) is ignored by raising, and is marked with a preposition characteristic of the case relation involved. (On the agentive/neutral assigned to (21c) see Sect. 3.)

More recently, it has been claimed (cf. again Anderson 1990, 1991) that raising (including passive) is structure-building; more generally, that syntactic structure is built up monotonically on the basis of the valencies (specified crucially in terms of case relations) of individual lexical items. Such developments serve to enable us to bring into sharper focus the differences between the lexical case grammar advocated by Starosta and the tradition within which case relations are seen as syntactically basic. Crucially involved is the validity of a syntactic/lexical distinction. Advocates of the distinction (eg., Anderson 1984) argue, for instance, for a differentiation between syntactic and lexical passives (derived adjectives); it is unclear how, if legitimate, this distinction is to be reconstructed in purely lexical terms. Another central question for the lexical approach (apart from those mentioned above) is: how are the alleged asymmetries between the roles of case relations and case forms to be accounted for? This involves both the syntactic asymmetry associated with strict cyclicity (deployed in the description of raising given above) and the lexical asymmetry associated with the claimed failure of lexical rules to make reference to case forms.

Case grammar approaches (including perhaps functional grammar) are united in highlighting the contrastive status of case relations: they have to be stipulated lexically. Many other aspects of syntactic and lexical structure are redundant, derivative of case specifications and, for example, parametric settings for basic word order. The case relations are also semantically identified, though distributionally distinctive. Anderson (1989, 1990, 1991, 1992) thus sees case grammar as a subpart of notional grammar, wherein all the basic elements of the syntax, including word classes, though distributionally established, are identified on the basis of semantic properties displayed by their prototypical members.

As Sect. 2 has in part illustrated, other aspects of case grammar have been much more contentious. To some extent this reflects choice among theoretical alternatives relatively independent of the case grammar hypothesis. Independence of hypotheses within grammatical systems, however, is only ever relative. Thus, whereas Fillmore (1968a, 1971a) remains rather undecided concerning the appropriate representation of syntactic structures including cases, others (e.g., Robinson 1970; Anderson 1971; Tarvainen 1987—and cf. Tesnière 1959) have argued that case relations, specifically, are most appropriately expressed by dependency structures. In terms of the framework of Anderson (1971), for instance, (22) would correspond to (4) (again initially unlinearized), with case nodes dependent on the V(erb) and governing the N(oun); erg = ergative (roughly, agentive—see Sect. 3), nom = nominative (neutral).



(22)

The correlation between the dependency hypothesis, and other aspects of syntax, and the CG hypothesis itself is controversial. But perhaps the least agreed on aspect of case grammar has been the constitution of the set of case relations themselves, an issue which remains unresolved.

3. Defining Case Relations

The arguments of a predicate identify the entities involved in the situation described by the predicate. The nature of the roles played by these entities can be discriminated in more or less detail. In a sense, each predicate prescribes a unique set of roles. But it is possible to generalize over various 'fields' of the vocabulary; and in certain institutionalized situations, in particular, these roles are made lexically explicit in the language. Thus, in the situations described by English verbs like *sell*, *buy*, *barter*, etc., one recurrent role is occupied by a customer; in those described by *concede*, *justify*, *accuse* etc., there recurs a defendant, perhaps (Fillmore 1971c, 1972: § 42, 1977b). More generally still, one can recognize that in many situations it is possible to attribute to a particular entity the role of source of the action, the agentive role. The customer in (23a) and the defendant in (b):

Algernon bought a Lada from Bert (23a)

Algernon justified his decision unconvincingly (23b)

are both agentive, as sources of the immediate action described by the verb. There is no simple mapping between such generalized roles and the more specific institutionalized functions. The customer in (24), for instance, is not presented as the source of the immediate action:

Bert sold a Lada to Algernon (24)

even though the same 'real-world' event may be being referred to by (23a) and (24). Much of Fillmore's work since the early 1970s has been concerned with the cognitive structures, Frames, within which detailed role specifications are articulated. However, it is generalized roles such as agentive that case grammarians identify as case relations, those semantic functions which are basic to the lexicon and/or syntax.

There has been some agreement, and much disagreement, concerning the set of roles that fulfill this function in the grammar. (For a recent survey see Somers 1987.) The set of case relations offered in Fillmore (1968a: 24–25) was tentative and not intended as necessarily exhaustive. He suggests:

Agentive (A): the case of the typically animate perceived instigator of the action identified by the verb;

Instrumental (I): the case of the inanimate force or object causally involved in the action or state identified by the verb;

Dative (D): the case of the animate being affected by the state or action identified by the verb;

Factitive (F): the case of the object or being resulting from the action or state identified by the verb, or understood as a part of the meaning of the verb;

Locative (L): the case which identifies the location or spatial orientation of the state or action identified by the verb;

Objective (O): the semantically most neutral case, the case of anything representable by a noun whose role in the action or state identified by the verb is identified by the semantic interpretation of the verb itself; conceivably the concept should be limited to things which are affected by the action or state identified by the verb.

Other possibilities are mentioned elsewhere. Fillmore (1971b: § 4) proposes that 'the case notions that are most relevant to the subclassification of verb types include the following:

Agent (A): the instigator of the event;

Counter-agent (C): the force or resistance against which the action is carried out;

Object (O): the entity that moves or changes or whose position or existence is in consideration;

Result (R): the entity that comes into existence as a result of the action;

Instrument (I): the stimulus or immediate physical cause of an event;

Source (S): the place from which something comes;

Goal (G): the place to which something moves;

Experiencer (E): the entity which receives or accepts experiences or undergoes the effect of an action (earlier called 'Dative').'

Fillmore (1971a) contains a slightly different list, in particular lacking result (regarded there as a goal) and counter-agent and including location, time and path. Starosta (1988) suggests a set much reduced compared to his (and Fillmore's) earlier proposals:

Patient (PAT): the perceived central participant in a state or event (formerly also Object or Theme);

Agent (AGT): the perceived external instigator, initiator, controller, or experiencer of the action, event, or state (formerly also dative, experiencer, force, instrument);

Locus (LOC):

inner: the perceived concrete or abstract source, goal, or location of the patient (formerly also source, goal, or path);
outer: the perceived concrete or abstract source, goal, or location of the action, event, or state (formerly also place);

Correspondent (COR):

inner: the entity perceived as being in correspondence with the patient (formerly dative, experiencer, range, increment);
outer: the perceived external frame or point of reference for the action, event, or state as a whole (formerly benefactive, reference);

Means (MNS):

inner: the perceived immediate affector or effector of the patient (formerly instrument, material, vehicle);
outer: the means by which the action, state, or event as a whole is perceived as being realized (formerly instrument, manner).

And Cook (1978: 299) proposes agent, experiencer, benefactive, object and locative, while Longacre (1976: 27–34) has experiencer, patient, agent, range, measure, instrument, locative, source, goal, path. (The inner/outer distinction invoked by Starosta is discussed below.) These sets at least show some overlap; much less of this is evident in, for example, the rather more exotic set proposed by Tarvainen (1987). Such uncertainty over the set of cases, also well illustrated by the introductory discussion to Stockwell et al.'s (1973: ch. 12, § 11.A) 'sample lexicon,' has often been cited in criticism of the case grammar framework (e.g., Chapin 1972). It might, indeed, be regarded as a sign of lack of responsibility to describe a particular case as a 'wastebasket' (Fillmore 1971a: 42). Unless a theory of case is properly constrained, new cases are liable to crawl out of (or be rescued from—Radden 1978) the 'wastebasket' or from even less desirable spots.

It should, however, be pointed out that the same challenge, or problem, confronts any framework which includes semantic functions, or thematic roles (Gruber 1965; Jackendoff 1983; and descendants), whose status is now seen by a number of noncase grammarians as central to the grammar (cf., for example, the discussions and references in Wilkins 1988). Moreover, the determination of the set of syntactic categories as a whole remains contentious. How, for instance, does one group and hierarchize the classes indicated by the labels universal quantifier (e.g., *all*), distributive quantifier (e.g., *every*), existential quantifier (e.g., *some*), adjectival quantifier (e.g., *many*), quantificational adjective (e.g., *numerous*, *various*), cardinal numeral, ordinal numeral, superlative adjective, . . . (see Anderson 1989)? However, the defendant has to concede that the resolution of the question of the constitution of the set of semantic functions is rather more crucial for a framework in which they play such a fundamental role as is advocated by case grammarians. Thus, much effort has been devoted within case grammar not merely to the establishing of definitions and semantic/syntactic properties of the individual cases (cf., for example, Fillmore's (1972: § 32) discussion of experiencer and *personally*), but also to the formulation of general principles governing the distribution of cases and (less commonly) of a general substantive theory of the category of case.

Some case relations seem to be well established: agentives and neutrals, for instance, are generally invoked, with agreement over the central instances of such; and their status as cases is supported by many of the phenomena alluded to in Sects. 1 and 2. And a place or locative case is generally acknowledged, though its relation to source and goal is contentious. It is also generally agreed that predicates of experience like *like* involve a distinct case, which Fillmore (1968a) dubbed dative; but the scope of this case is controversial, with Fillmore (1971a, b), as seen above, for instance, reassigning some former datives to goal or neutral and relabeling the rest experiencer:

> where there is a genuine psychological event or mental state verb, we have the Experiencer; where there is a non-psychological verb which indicates a change of state, such as one of dying or growing, we have the Object; where there is a transfer or movement of something to a person, the receiver as destination is taken as the Goal.
> (Fillmore 1971a: 42)

Many investigators recognize an instrumental case relation, as illustrated in (25):

The vandals dented the BMW *with a hammer* (25a)

A hammer dented the BMW (25b)

and some (cf. Fillmore 1971a: § 9) a path:

Henry traveled *through Celle*. (26)

Anderson (1971, 1977), however, rejects both of these as cases, as well as most of the others that have been proposed, in favor of a very restricted set of case relations. Much of this disagreement can be understood in terms of diverse interpretations of the distributional and substantive constraints which case relations conform to.

The nature of these constraints and the differences in their application can perhaps best be appreciated in terms of an examination of a case on whose validity most researchers seem to be agreed, the agentive. One can provide agentive with a distinctive semantic definition, perhaps along the lines of one of those given above, and we can associate phrases so defined with a distinctive distribution, particularly in relation to their role in the subject selection hierarchy. Occurrence of agentive apparently correlates with other semantico-syntactic properties: zero-manifestation in imperatives (*Kill Albert!*, etc.), adverbial selection:

Emma killed Albert in cold blood/deliberately (27a)

*Albert died in cold blood/deliberately (27b)

where interpretation of (27b) requires some extension of our normal understanding of the argument-type demanded by *die*. Agentives are also, perhaps, 'typically animate' (Fillmore 1968a), even human, as in these examples.

Some phrases that share their basic distribution with agentives like *Emma* in (27a) are not human, or even animate, however:

Lightning killed Albert (28a)

Albert was killed by lightning (28b)

and lack many of the associated properties. This can perhaps be allowed for in terms of Fillmore's '*typically* animate'; perhaps, to elaborate on this somewhat, *lightning* in (28) is a nonprototypical agentive. But what of (29):

The poison killed Albert (29a)

Albert was killed by the poison (29b)

and the like? For Fillmore (1968a) *the poison* is an instrumental, which in the presence of an agentive is necessarily marked by *with*:

Emma killed Albert with the poison (30a)

Albert was killed with the poison (by Emma) (30b)

But the source of *the poison* in (29a) is in fact indeterminate, given Fillmore's definitions (either A or I), or a nonexistent ambiguity is predicted for its role. One solution to this is to suggest that instrumentals only ever occur with predicates that also take an agentive (an instrument presupposes an agent) and to regard *the poison* in (29) as agentive: it is a nonprototypical agentive that one interprets as normally fitting into a frame or scene which includes an (unspecified) ultimate agent. Likewise, there is no distributional reason to recognize a distinct force case (Huddleston 1970) associated with *lightning* in (28): volition and the capacity to wield an instrument are not necessarily to be attributed to nonprototypical agentives. The fact that *the poison* in (29) and (30) is now interpreted as bearing two different cases is analogous to the situation which was associated with the customer role above: an entity bearing the same role, say instrument, in a 'real-world' situation may be represented linguistically in different ways (cf. (23a) and (24)), in this instance as agentive or instrumental. (See Anderson 1977: ch. 1; and for a more general description of instrumentals, Nilsen 1973.)

Similarly, it can be argued that though Fillmore (1971a: § 4) eliminates result (or factitive) uniformly in favor of goal, a particular result situation again may be associated with different case structures. Thus, while it seems appropriate to associate his description of result as 'the end-result role of a thing which comes into existence as a result of the action identified by the predicator,' and thus as a goal, with examples like (31):

I converted my impressions into a poem (31)

this is not the case with the examples, like (32):

I wrote a poem (32)

which Fillmore cites: the goal in (32) is the existing of a poem; the *poem* itself is a neutral (object), it represents the entity which undergoes the action of being brought into existence, just as in (33):

I destroyed a poem (33)

an entity is represented (as a neutral) as being removed from existence (and is, of course, no more a source than *poem* is a goal in (32)).

Such discussions illustrate the need for a set of distributional principles for the cases, as well as for semantic (or notional) definitions which recognize the importance of prototypicality. One can approach a consideration of some of the principles that have been suggested by pursuing discussion of the instrumental. Anderson (1977) argues that the subjects of (28a) and (29a) are not instrumentals. Similarly, the instrument in (34) is not instrumental:

Algy used a clean napkin (34)

but a neutral undergoing the action (of 'using'). If so, prototypical instrumentals such as are realized in (30) do not participate in subject and object selection; indeed, arguably, they are not an independent component of the subcategorization requirements of any predicate. To put it in its strongest form, it has been claimed that instrumentals are available with any agentive predicate. Of course, the class of instrumental will vary with the class of agentive predicate: one *travels by car* rather than *with a car* (unless one is merely accompanying it). If the availability of instrumentals can be allowed for by redundancy, i.e., their occurrence need never be stipulated by the case features of any predicate, then they can be removed from the set of primary cases. They are not participant but circumstantial (Halliday 1967/68; Anderson 1977, 1986); not actants (Tesnière 1959). The drawing of a distinction between participant and circumstantial is the first step in arriving at a delimitation of the set of (participant) case relations. It is only to potential participants that distributional criteria such as Fillmore's (1971a) principles of 'contrast' and 'complementarity' can be fully applied (see below); circumstantials require a rather different approach.

Circumstantials largely correspond to what many case grammarians have dubbed outer cases. (It is less clear to what extent circumstantials as characterized here also correspond in general to Fillmore's modal cases.) And perhaps a less controversial circumstantial is what Fillmore calls the outer locative, illustrated in (35):

Nigel made lots of money in London (35a)

In London Nigel made lots of money (35b)

which (given appropriate choice of lexical terms) can appear with any predicate, and, for example, is readily fronted. Contrast the (inner) locative in (36):

Nigel kept lots of money in a sock (36a)

?In a sock Nigel kept lots of money (36b)

which is part of the case frame (in its absence the lexical item *keep* has a different sense— 'retain') and can be accompanied by an outer locative:

Nigel kept lots of money in a sock in London (37a)

In London Nigel kept lots of money in a sock (37b)

where (b) lacks the additional interpretation available with (a) with respect to which *in London* modifies *sock*.

Anderson (1977: ch. 1) argues that a number of proposed (propositional) cases are circumstantial. Thus, time, for instance, as in (38):

Brenda left on Tuesday (38)

is always circumstantial. For Anderson, the temporal phrases in (39):

The concert lasted from seven to eleven (39)

and (40):

A long period elapsed (40)

are, respectively, source and goal, and neutral, associated here with verbs that require that their source-and-goal or neutral argument involve temporal reference. And *Tuesday* in (41):

Tuesday saw Brenda's departure (41)

is a nonprototypical experiencer. Such a proposal is based on a strategy of eliminating, as distinctions in case, contrasts that are basically signaled elsewhere. As such, it can be said to represent an implementation of Fillmore's (1971a: 40–41) principle of 'complementarity.'

Fillmore (1971a: § 3) also offers two assumptions which he terms principles of 'contrast.' The second principle, unformulated as such, is concerned with the establishment of contrasts in case relation associated with a single (syntactic) position. Fillmore illustrates this with comparative constructions and with the subjects of the same predicate in (42):

I am warm (42a)

This jacket is warm (42b)

Summer is warm (42c)

The room is warm. (42d)

On one interpretation, *I* in (42a) is an experiencer (and *warm* a psychological predicate); *this jacket* in (b) is an instrument; *summer* in (c) is a time; *the room* in (d) is a locative/location. These assignments are supported by the recurrence of such distinctions in subject position with other predicates (Fillmore discusses *sad*), but it is unclear what the syntactic consequences of some of the posited distinctions might be. Fillmore's discussion of comparatives (only noun phrases of identical case can be compared) is inconclusive in this respect, in that it is apparent that many other semantic factors are involved in determining the well-formedness of such constructions. And Anderson's implementation of 'complementarity' would suggest that (c) and (d) (at least) in (42) do not involve a distinction in case (rather, of referential domain). Application of a 'contrast' principle here necessitates that the rest of the environment be kept constant, and thus 'complementarity' eliminated.

The other principle of 'contrast' discussed by Fillmore (1971a) is the one-instance-per-clause principle: i.e., a single clause will contain at most one (possibly compound) noun phrase associated with a particular case. This has been generally accepted (even outside case grammar), and seems to be well supported. The principal area of dissent concerns neutral, which Anderson (1971; also 1977: ch. 1) suggests occurs twice in equatives (*The guy over there is the man she loves*, etc.). He associates this with a further property that has been attributed to neutral; that it is obligatory with every predicate (what Starosta 1987, also 1978, refers to as patient centrality).

This principle has been frequently coupled with a companion principle requiring that each NP bear at most one case relation (Fillmore 1968a: 24). However, it has been argued that this is quite generally inappropriate (not just with respect to specific cases). At issue are, amongst other things, sentences like those in (43):

Bert has moved the bookcase (43a)

The bookcase has moved (43b)

Bert has moved (43c)

(and see also on this and other areas—such as the *see/look* case frames—Huddleston 1970; Anderson 1968: appendix, 1971: ch. 1). In (43a) *Bert* and *the bookcase* are fairly uncontroversially A and N, respectively; and in (b) *the bookcase* is once more neutral. But what of *Bert* in (c)? It is clearly neutral: *Bert* undergoes the movement; and its status as such is required by patient centrality. But on one interpretation at least *Bert* is also the source of the action, agentive. And there are semantic and syntactic consequences (adverb modification, unergativity, etc.); some of these are also illustrated by the sentences from eastern Pomo given in (2) above. For a contrary view, however, see Starosta (1987), for instance. Somers (1987: ch. 8) surveys some of the arguments involved.

Starosta (1988: § 4.3) introduces a third 'case-like' category (beside case forms and case relations), namely macroroles (cf. Foley & van Valin 1982), of which there are two: actor and undergoer. The actor is the agent of a transitive clause or the patient of an intransitive one. These are 'established to account primarily for morphosyntactic rather than situational generalizations' (Starosta 1988: 145). But one might have expected them to allow for such phenomena as others have associated with attribution of more than one case relation to a single argument, while maintaining the one-instance-per-NP constraint. However, 'it appears that actor, like patient, is present in every clause' (Starosta 1988: 146). Thus, both *the bookcase* in (43b) and *Bert* in (c) would apparently be [+actr, +PAT]. The semantic distinction remains uncaptured. Actor also does not seem to accord well with the syntactic functions Starosta attributes to it. Thus, 'the actant which may be omissible in imperatives . . . is the actor' (Starosta 1988: 151). But not all intransitive patients show unmarked imperativization: this is true of (43b) as well as of the patients associated with verbs like *stumble*, *blister*, etc., under their normal (nonmetaphorical) interpretation.

Anderson (1977: particularly ch. 2) deploys 'complementarity' and nonunary case assignments for NPs to argue, without recourse to macroroles, for a very reduced set of (participant) cases. For instance, he suggests that path is a combination of source and goal; that goal is a variant of locative (with a predicate that also takes a source, a directional predicate). Experiencers are interpreted as a combination of locative with a case relation which, uncombined with locative, characterizes agentives: a case relation he calls ergative. Thus, the case relations in (43) are respectively represented as in (44a–c) and those in (7a) and (42a) as respectively (44d–e):

erg abs (44a)

abs (44b)

erg + abs (44d)

erg + loc abs (44d)

erg + loc + abs (44e)

(where Anderson's abs(olutive) is N, the nom of 1971). He proposes (Anderson 1977: 115) a set of four cases, given in (45), with each case characterized in terms of combinations of the notional features place and source, such that abs is unmarked and erg is a nonplace source, source of the event or situation, physical or mental, potentially in control of it. (See also, more recently, Ostler 1980.)

Case Relations	abs	erg	loc	abl	(45)
Case Features			place	place	
		source		source	

These characterizations incorporate a general substantive principle determining the character of case relations, to complement the distributional and individual properties mentioned above. They instantiate one articulation of the localist hypothesis (cf. localism), whose earlier history is charted by Hjelmslev (1935/37), in terms of which the domain of case is structured by components utilized in our perception of spatial situations: there are no necessarily 'abstract' case relations. The hypothesis is one attempt to provide a general definition of case, avoiding the problems of uncertainty and overlap associated with notional definitions particular to individual cases. The importance of a nonparticularist approach to case is forcibly expressed by Hjelmslev (1935: 4):

> Délimiter exactement une catégorie est impossible sans une idée précise sur les faits de signification. Il ne suffit pas d'avoir des idées sur les significations de chacune des formes entrant dans la catégorie. Il faut pouvoir indiquer la signification de la catégorie prise dans son ensemble.

Apart from within the localist tradition, it is only recently (with developments in cognitive grammar (see *Cognitive Grammar*) and elsewhere) that such a viewpoint has been to the forefront in the mainstream of the structuralist linguistic tradition in the last few decades.

The postulation of a universal theory of case is, of course, not to say that the 'same' situation will be expressed in terms of the same case frame in different languages, or that what can be an erg in language A will necessarily correspond to an erg in language B (cf. Dahl 1987). The English experiencer (erg + loc) in (41) is alien to a large number of languages, for instance. Rather, these relations form the basis for constructing clause structures in any language, and their applicability is limited primarily, within the localist tradition, by the spatial prototypes with which they are associated.

Among the many uncertainties and contentious issues surrounding notions of case, some of which are surveyed here (and see too Cook 1989, for another overview), perhaps the least explored is the character and status of circumstantials. Anderson (1986) suggests that, despite their apparent diversity, the set of circumstantials can be described using the same set of (combinations of) case relations as are appropriate to distinguishing participants, and that the hierarchy of circumstantials in terms of their closeness of relation to the central proposition is associated with the specificity of the verb class with which they are compatible. Thus, instrumentals, insofar as they are compatible only with agentive verbs, are more tightly integrated than outer locatives or circumstantial time phrases. But here in particular much research remains to be done (in any framework). For discussion see Somers (1987: ch. 1).

Bibliography

Abraham W (ed.) 1971 *Kasustheorie*. Athenäum, Frankfurt

Abraham W (ed.) 1978 *Valence, Semantic Case and Grammatical Relations*. Benjamins, Amsterdam

Anderson J M 1968 Ergative and nominative in English. *Journal of Linguistics* **4**: 1–32

Anderson J M 1971 *The Grammar of Case: Towards a Localistic Theory*. Cambridge University Press, Cambridge

Anderson J M 1977 *On Case Grammar: Prolegomena to a Theory of Grammatical Relations*. Croom Helm, London

Anderson J M 1978 On the derivative status of grammatical relations. In: Abraham W (ed.) 1978

Anderson J M 1980 Anti-unaccusative, or: Relational grammar is case grammar. *Revue roumaine de linguistique* **25**: 193–225

Anderson J M 1982 Analysis and levels of linguistic description. In: Siciliani E, Barone R, Aston G (eds.) *La lingua inglese nell'universitá*. Adriatica, Bari

Anderson J M 1984 *Case Grammar and the Lexicon*. University of Ulster Occasional Papers in Linguistics and Language Learning, Coleraine

Anderson J M 1986 Structural analogy and case grammar. *Lingua* **70**: 79–129

Anderson J M 1987 Case grammar and the localist hypothesis. In: Dirven R, Radden G (eds.) 1987

Anderson J M 1989 Reflections on notional grammar, with some remarks on its relevance to issues in the analysis of English and its history. In: Arnold D J, et al. (eds.) *Essays on Grammatical Theory and Universal Grammar*. Oxford University Press, Oxford

Anderson J M 1990 On the status of auxiliaries in notional grammar. *Journal of Linguistics* **26**: 341–62

Anderson J M 1991 Notional grammar and the redundancy of syntax. *Studies in Language* **17**: 301–33

Anderson J M 1992 *Linguistic Representation: Structural Analogy and Stratification*. Mouton de Gruyter, Berlin

Anderson J M, Dubois-Charlier F (eds.) 1975 *La grammaire des cas* (= *Langages* **38**). Didier–Larousse, Paris

Anderson S R 1971 On the role of deep structure in semantic interpretation. *Foundations of Language* **7**: 387–96

Böhm R 1986 Indirect object advancement: From relational to case grammar (via Kalkatungu). *Australian Journal of Linguistics* **6**: 73–105

Chafe W 1970 *Meaning and the Structure of Language*. University of Chicago Press, Chicago, Illinois

Chapin P G 1972 Review of Stockwell R P, Schachter P, Partee B H 1968 *Integration of Transformational Theories on English Syntax*. University of California, Los Angeles, California. *Language* **48**: 645–67

Chomsky N 1965 *Aspects of the Theory of Syntax*. MIT Press, Cambridge, Massachusetts

Cook W A 1971 Case grammar as deep structure in tagmemic analysis. *Languages and Linguistics Working Papers, Georgetown University* **2**: 1–9

Cook W A 1972a A set of postulates for case grammar analysis. *Languages and Linguistics Working Papers, Georgetown University* **4**: 35–49

Cook W A 1972b A case grammar matrix. *Languages and Linguistics Working Papers, Georgetown University* **6**: 15–47

Cook W A 1973 Covert case roles. *Languages and Linguistics Working Papers, Georgetown University* **7**: 52–81

Cook W A 1978 A case grammar matrix model (and its application to a Hemingway text). In: Abraham W (ed.) 1978

Cook W A 1979 *Case Grammar: Development of the Matrix Model (1970–78)*. Georgetown University Press, Washington, D.C.

Cook W A 1989 *Case Grammar Theory*. Georgetown University Press, Washington, D.C.

Dahl Ö 1987 Case grammar and prototypes. In: Dirven R, Radden G (eds.) 1987

Dik S C 1978 *Functional Grammar*. North-Holland, Amsterdam

Dik S C 1987 Some principles of functional grammar. In: Dirven R, Radden G (eds.) 1987

Dirven R, Radden G (eds.) 1987 *Concepts of Case*. Gunter Narr, Tübingen

Fillmore C J 1965 Toward a modern theory of case. *Project on Linguistic Analysis, Ohio State University* **13**: 1–24

Fillmore C J 1966 A proposal concerning English prepositions. *Monograph Series on Languages and Linguistics, Georgetown University* **19**: 19–33

Fillmore C J 1968a The case for case. In: Bach E, Harms R T (eds.) *Universals in Linguistic Theory*. Holt, Rinehart and Winston, New York

Fillmore C J 1968b Lexical entries for verbs. *Foundations of Language* **4**: 373–93

Fillmore C J 1970 The grammar of hitting and breaking. In: Jacobs R A, Rosenbaum P S (eds.) *Readings in English Transformational Grammar*. Ginn, Waltham, Massachusetts

Fillmore C J 1971a Some problems for case grammar. *Monograph Series on Languages and Linguistics, Georgetown University* **23**: 35–56

Fillmore C J 1971b Types of lexical information. In: Steinberg D D, Jakobovits L A (eds.) *Semantics: An Interdisciplinary Reader*. Cambridge University Press, Cambridge

Fillmore C J 1971c Verbs of judging. In: Fillmore C J, Langendoen D T (eds.) *Studies in Linguistic Semantics*. Holt, Rinehart and Winston, New York

Fillmore C J 1972 Subjects, speakers and roles. In: Davidson D A, Harman G H (eds.) *Semantics of Natural Language*. Reidel, Dordrecht

Fillmore C J 1977a The case for case reopened. In: Cole P, Sadock J (eds.) *Syntax and Semantics 8: Grammatical Relations*. Academic Press, New York

Fillmore C J 1977b Topics in lexical semantics. In: Cole R W (ed.) *Current Issues in Linguistic Theory*. Indiana University Press, Bloomington, Indiana

Fillmore C J 1987 A private history of the concept 'frame.' In: Dirven R, Radden G (eds.) 1987

Foley W A, Valin R D van 1984 *Functional Syntax and Universal Grammar*. Cambridge University Press, Cambridge

Gruber J S 1965 Studies in lexical relations (Doctoral dissertation, Massachusetts Institute of Technology)

Halliday M A K 1967/68 Notes on transitivity and theme in English. *Journal of Linguistics* **3**: 37–81, 199–244; **4**: 179–215

Hjelmslev L 1935/37 La catégorie des cas. *Acta Jutlandica* **7**; i–xii, 1–184; **9**: i–vii, 1–78

Huddleston R D 1970 Some remarks on case grammar. *Linguistic Inquiry* **1**: 501–11

Jackendoff R S 1983 *Semantics and Cognition*. MIT Press, Cambridge, Massachusetts

Katz J J 1972 *Semantic Theory*. Harper & Row, New York

Longacre R E 1976 *An Anatomy of Speech Notions*. Peter de Ridder, Lisse/Holland

Lyons J 1968 *Introduction to Theoretical Linguistics*. Cambridge University Press, Cambridge

Miller J E 1985 *Semantics and Syntax*. Cambridge University Press, Cambridge

Nilsen D L F 1972 *Toward a Semantic Specification of Deep Case*. Mouton, The Hague

Nilsen D L F 1973 *The Instrumental Case in English: Syntactic and Semantic Considerations*. Mouton, The Hague

Ostler N 1980 *A Theory of Case Linking and Agreement*. Indiana University Linguistics Club, Indiana

Platt J T 1971 *Grammatical Form and Grammatical Meaning: A Tagmemic View of Fillmore's Deep Structure Case Concepts*. North-Holland, Amsterdam

Radden G 1978 Can 'area' be taken out of the waste-basket? In: Abraham W (ed.) 1978

Robinson J J 1970 Case, category and configuration. *Journal of Linguistics* **6**: 57–80

Somers H L 1987 *Valency and Case in Computational Linguistics*. Edinburgh University Press, Edinburgh

Starosta S 1973 The faces of case. *Language Sciences* **25**: 1–14

Starosta S 1978 The one per Sent solution. In: Abraham W (ed.) 1978

Starosta S 1987 A place for (lexi-)case. In: Dirven R, Radden G (eds.) 1987

Starosta S 1988 *The Case for Lexicase: An Outline of Lexicase Grammatical Theory*. Pinter, London

Stockwell R P, Schachter P, Partee B 1973 *The Major Syntactic Structures of English*. Holt, Rinehart & Winston, New York

Tarvainen K 1987 Semantic cases in the framework of dependency theory. In: Dirven R, Radden G (eds.) 1987

Tesnière L 1959 *Eléments de syntaxe structurale*. Klincksieck, Paris (2nd edn., 1965)

Welte W 1987 On the concept of case in traditional grammars. In: Dirven R, Radden G (eds.) 1987

Wilkins W (ed.) 1988 *Syntax and Semantics 21: Thematic Relations*. Academic Press, New York

---

Cognitive Grammar

Ronald W. Langacker

'Cognitive grammar' (originally called 'space grammar') is a highly innovative theory of linguistic structure that has been developed and progressively articulated since 1976. In stark contrast to modular approaches, it regards language as an integral facet of cognition, and grammar as being inherently meaningful. It presupposes a 'conceptualist' account of linguistic semantics that properly recognizes our capacity for construing the same conceived situation in alternate ways. With an appropriate view of meaning, all grammatical elements are reasonably attributed some kind of conceptual import. Grammar is thus considered 'symbolic' in nature: it reduces to the structuring and symbolization of conceptual content.

1. Linguistic Organization

The ultimate goal of linguistic research is to characterize language as a cognitive entity. As envisaged in cognitive grammar, linguistic structure ultimately reduces to recurrent patterns of neurological activity, and owing to its multifaceted complexity, a language is more aptly likened metaphorically to a biological organism than to a computer program or a logical deductive system. Thus it is not presumed that any single formalism can capture all aspects of a given phenomenon, or that any particular notation translates directly into specific psychological claims. The various notations and descriptive formats devised in cognitive grammar are meant to be precise within the limits of our understanding and revelatory for particular descriptive and analytical purposes. They do not however constitute a strict or uniquely privileged formalization, nor is the expectation of such a formalism considered appropriate.

To the extent that a pattern of neurological activity is 'entrenched' and readily elicited as a pre-established whole, it is referred to as a 'unit.' Linguistic knowledge or ability (i.e., a speaker's grasp of linguistic convention) comprises a vast array of such units, which is structured in the sense that units participate in excitatory and inhibitory relationships, and that some units include others as components. This knowledge—the 'internal grammar'—is not conceived as a generative or constructive device. The function of linguistic units is rather to serve as templates for the 'categorization' of expressions. An expression is simultaneously categorized by a multitude of units, each of which corresponds to a particular aspect of its structure and represents a constraint on its possible well-formedness (conventionality). Units compete for activation and the privilege of categorization on the basis of entrenchment and their degree of overlap with the target expression.

Cognitive grammar imposes severe limitations on the kinds of units ascribable to a linguistic system. On the one hand, it posits only (a) semantic units, (b) phonological units, and (c) symbolic units (in which semantic and phonological units are linked by symbolic relationships). This is the bare minimum needed to accommodate the basic semiological function of language, namely the symbolization of conceptualizations by means of phonological sequences. Symbolic units are held sufficient for the description of lexicon, morphology, and syntax, which form a continuum (rather than discrete components). On the other hand, cognitive grammar observes the 'content requirement,' which restricts linguistic units to (a) semantic, phonological, and symbolic structures that occur overtly as (parts of) expressions, (b) 'schematizations' of permitted structures, and (c) 'categorizing relationships' between permitted structures (including 'instantiation' of a schema and 'extension' from a prototype). By virtue of these restrictions, the theory achieves naturalness, conceptual unification, and theoretical austerity.

2. Semantic Structure

Cognitive grammar maintains that grammatical structure is 'symbolic' in nature, being fully describable in terms of symbolic links between semantic and phonological structures. The viability of this conception of grammar depends on a particular view of linguistic semantics.

2.1 Basic Tenets

Cognitive semantics rests on several fundamental notions. First, meaning is not identified with truth conditions, but with 'mental experience' or 'conceptualization' in the broadest sense of that term. Included are novel conceptions (as well as established concepts), all facets of sensorimotor experience, and cognizance of the social, linguistic, and cultural context. Second, a linguistic category is typically 'complex': its adequate description requires not just a single structure, but a set of structures linked by relationships of instantiation and extension to form a network. As a special case of this phenomenon, lexical items are typically 'polysemous.' A lexeme's meaning comprises a network of related senses, some being schematic relative to others, and some constituting extensions vis-à-vis more prototypical values. Third, linguistic semantics is 'encyclopedic' in scope. The meaning of a lexical item (even a single sense) cannot in general be captured by a limited, dictionary-type definition. Everything we know about an entity can in principle be regarded as contributing to the meaning of an expression that designates it, even though certain specifications are far more central and linguistically important than others. One cannot motivate any sharp distinction (only one of degree) between semantics and pragmatics, or between 'linguistic' and 'extralinguistic' knowledge. Finally, an expression's meaning does not consist solely in the conceptual content it evokes (let alone in truth conditions or the objective situation it describes)—equally significant is how that content is 'construed.' Two expressions may invoke the same conceptual content yet differ semantically by virtue of the construals they impose.

2.2 Construal

Numerous aspects of construal have been identified. They are conveniently grouped under several broad rubrics: specificity, scope, background, perspective, and prominence.

We have the capacity to conceive an entity or situation at varying levels of specificity and detail, as witnessed by such hierarchies as *thing > creature > insect > fly > fruit fly*. Each term in the hierarchy is 'schematic' for (and 'elaborated' by) the one that follows, which characterizes the designated entity with greater precision (finer resolution).

An expression's 'scope' comprises the full array of conceptual content that it specifically evokes and relies upon for its characterization. The term 'lid,' for instance, evokes the schematic conception of a container, as well as the notion of one entity covering another. A conception of any type or any degree of complexity is capable of being invoked as part of an expression's meaning. Numerous conceptions—called 'cognitive domains'—typically figure in the meaning of a given expression, which may evoke them in a flexible and open-ended manner (as determined by context). Hence the starting point for semantic description is not a set of semantic features or conceptual primitives, but rather an appropriate array of integrated conceptions, among them higher-order structures representing any level of conceptual organization. At the lowest level, presumably, are cognitively irreducible 'basic domains' such as space, time, and the domains associated with the various senses (e.g., color space).

Another aspect of construal is our ability to conceive of one structure against the 'background' provided by another. Categorization is perhaps the most fundamental and pervasive manifestation of this ability. Another is the relationship between the source and target domains of a metaphor. Words like *even*, *only*, *many*, *few*, *more*, and *less* compare an actual value to some norm or expectation, and the contrast between the truth-functionally equivalent *half-empty* and *half-full* is well known. More generally, such phenomena as presupposition, anaphora, and the given/new distinction all involve construal against a certain kind of background.

Perspective subsumes such factors as *vantage point*, *orientation*, and the *subjectivity* or *objectivity* with which an entity is construed. Vantage point and orientation both figure in the two interpretations of *Jack is to the left of Jill*, where Jack's position may be reckoned from either the speaker's perspective or from Jill's. By subjectivity or objectivity is meant the degree to which an entity functions asymmetrically as the 'subject' or the 'object of conception.' The conceptualizers (i.e., the speaker and addressee) are construed subjectively in *There's a mailbox across the street*, where they remain implicit as 'offstage' reference points. They construe themselves more objectively in *There's a mailbox across the street from us.*

The final aspect of construal is the relative 'prominence' accorded to the different substructures of a conception. Various kinds of prominence need to be distinguished. One is the salience that comes with objective construal and explicit mention, as in the previous example. A second type of prominence is called 'profiling': within the conception it evokes, every expression singles out some substructure as a kind of focus of attention; this substructure—the 'profile'—is the one that the expression 'designates.' For example, *hypotenuse* evokes the conception of a right-angled triangle (its scope) and profiles (designates) the side lying opposite the right angle. *Above* profiles the spatial 'relationship' between two entities. A third type of prominence pertains to the participants in a profiled relationship. One participant, termed the 'trajector,' is analyzed as the 'figure' within the profiled relationship; an additional salient entity is referred to as a 'landmark.' For instance, because *above* and *below* evoke the same conceptual content and profile the same relationship, their semantic contrast can only reside in figure/ground alignment. *X is above Y* is concerned with locating *X*, which is thus the trajector (relational figure), whereas *Y is below X* uses *X* as a landmark to specify the location of *Y*.

3. Grammatical Structure

Grammar is claimed to be 'symbolic' in nature. Only symbolic units (form–meaning pairings) are held necessary for the description of grammatical structure. Thus all valid grammatical constructs are attributed some kind of conceptual import. Rather than being autonomous in regard to semantics, grammar reduces to the structuring and symbolization of conceptual content.

3.1 Grammatical Classes

An expression's grammatical class is determined by the nature of its profile. The most fundamental distinction is between a 'nominal' and a 'relational' expression, which respectively profile a 'thing' and a 'relationship.' Both terms are defined abstractly. A thing is characterized schematically as a 'region in some domain,' where a 'region' can be established from any set of entities (e.g., the stars in a *constellation*) just by conceiving of them in relation to one another. While physical objects occupy bounded regions in space and are prototypical instances of the thing category, the schematic characterization also accommodates such entities as unbounded substances (e.g., *water*), geographical areas (*Wisconsin*), regions in abstract domains (*stanza*), collections of entities (*alphabet*), points on a scale (*F-sharp*; *30 C*), conceptual reifications (*termination*), and even the absence of some entity (*intermission*). The term 'relationship' is also broadly interpreted. It applies to any assessment of entities in relation to one another, regardless of their nature and status; in particular, they need not be distinct, salient, or individually recognized. Expressions classified as relational are therefore not limited to those (like *above*) traditionally considered two-place predicates. For instance, the adjective *blue* profiles the relationship between an object and a certain region in color space. When used as a noun, *square* profiles the region comprising a set of line segments arranged in a particular fashion (or else the area they enclose). When used as an adjective, however, it profiles the complex relationship among subparts of this geometrical figure (involving perpendicularity, equal length of sides, and so on).

Expressions that profile things include such traditional classes as noun, pronoun, and noun phrase (for which the term 'nominal' is adopted in cognitive grammar). Relational expressions subsume those traditionally recognized as adjectives, prepositions, adverbs, infinitives, participles, verbs, clauses, and full sentences. On the basis of the intrinsic complexity of their profiles, relational expressions can be divided into those which designate 'simple atemporal relations,' 'complex atemporal relations,' and 'processes.' A simple atemporal relation is one that comprises a single consistent configuration (or 'state'—hence it is also called a 'stative relation'). For example, adjectives and many prepositions have this character. A complex atemporal relation cannot be reduced to a single configuration but can only be represented as an ordered series of states. In *She walked across the field*, for instance, the preposition *across* designates a series of locative configurations defining the trajector's path with reference to the landmark. A process is a complex 'temporal' relation, i.e., one whose component states are saliently conceived as being distributed through a continuous span of time, and whose temporal evolution is viewed sequentially (rather than holistically). Verbs and finite clauses designate processes, whereas participles and infinitives impose a holistic view on the process specified by a verb stem and are thus atemporal.

3.2 Rules and Constructions

Grammar consists of patterns for combining simpler symbolic structures into symbolic structures of progressively greater complexity. A symbolically complex expression, e.g., *cracked*, represents a 'grammatical construction' wherein two 'component structures' (*crack* and *-ed*) are 'integrated' to form a 'composite structure.' Such integration, both phonological and semantic, is effected by 'correspondences' established between subparts of the component expressions, and by the superimposition of corresponding entities. Typically, one component structure corresponds to, and serves to 'elaborate,' a schematic substructure within the other. Thus *-ed*, being a suffix, makes schematic phonological reference to a stem, which *crack* elaborates to yield *cracked*. Semantically, the adjectival sense of the past participial morpheme profiles the final, resultant state of a schematically characterized process, which corresponds to the specific process profiled by *crack*. By superimposing the corresponding processes, and adopting the profiling of the participial morpheme, one obtains the composite semantic structure of *cracked*, which profiles a stative relation identified as the final state of *crack*.

It is usual for the composite structure to inherit its profiling from one of the component structures, which thereby constitutes the construction's 'head.' The suffix *-ed* is thus the head within the participial construction *cracked*. A component that elaborates the head is a 'complement,' hence *crack* is a complement of *-ed* by virtue of elaborating the schematic process it invokes. Conversely, a component that the head elaborates is a 'modifier.' In *blue square*, for instance, *blue* modifies *square* because the latter—the head—elaborates *blue*'s schematic trajector (the entity located in the blue region of color space).

Grammatical rules take the form of schematized constructions. A 'constructional schema' is a symbolically complex structure whose internal organization is exactly analogous to that of a set of constructions (complex expressions), but which abstracts away from their points of divergence to reveal their schematic commonality. For instance, the rule for adjective + noun combinations in English is a symbolic structure parallel to *blue square*, *cracked sidewalk*, *playful kitten*, etc., except that the adjective and noun are schematic rather than specific: semantically, the constructional schema specifies that the trajector of the adjective corresponds to the profile of the noun, which lends its profile to the composite structure; phonologically, it specifies that the adjective directly precedes the noun as a separate word. A constructional schema may be characterized at any appropriate level of abstraction, and represents the conventionality of a particular pattern of integration. It is available for the categorization of novel complex expressions and can also be thought of as a template used in their assembly.

3.3 Other Grammatical Elements

The foregoing remarks indicate that grammatical classes, rules, and such notions as head, complement, and modifier can all be characterized in terms of configurations of symbolic structures. The same is true of other grammatical elements. For instance, a 'nominal' (noun phrase) profiles a thing and further incorporates a specification of its relationship to the 'ground' (i.e., the speech event and its participants) with respect to fundamental, 'epistemic' cognitive domains; demonstratives, articles, and certain quantifiers serve this function in English. Similarly, a 'finite clause' profiles a process grounded (in the case of English) by tense and the modals. A 'subject' can then be characterized as a nominal which elaborates the trajector of a process profiled at the clausal level of organization, and a 'direct object' as a nominal that elaborates its primary landmark.

Grammatical markers are all attributed semantic values, often quite schematic. For example, the derivational morpheme *-er* (as in *complainer*) profiles a thing characterized only as the trajector of a schematic process; like most derivational morphemes, it is semantically schematic for the class it derives, its primary semantic value residing in the profile it imposes on the specific conceptual content provided by the stem it combines with. Besides schematicity, factors considered compatible with a grammatical marker's meaningfulness include semantic overlap with other elements (e.g., redundant marking, as in agreement), the lack of any option (as in government), and failure to exhibit a single sense in all its uses (polysemy being characteristic of both lexical and grammatical elements—e.g., *-ed* has distinct but related meanings in its adjectival, perfect, and passive uses).

4. Assessment and Outlook

Cognitive grammar has been revealingly applied to a steadily widening array of phenomena in a diverse set of languages. It is rapidly being established as a viable model of language structure, and in view of the restrictiveness and conceptual unification it achieves, it merits serious attention from linguistic theorists. It is fully compatible with 'functional' approaches to linguistic structure, which help explain why certain of the structures it permits have the status of prototypes, or represent language universals or universal tendencies. It also has a natural affinity to 'connectionist' (or 'parallel distributed processing') models of cognition, both because the distinction between rules and data is only one of degree, and also because grammatical structure reduces to form–meaning pairings. The possibility of achieving this reduction has extensive implications for language acquisition, models of language processing, and our conception of the human mind.

Bibliography

Haiman J 1980 Dictionaries and encyclopedias. *Lingua* **50**: 329–57

Lakoff G 1987 *Women, Fire, and Dangerous Things: What Categories Reveal about the Mind.* University of Chicago Press, Chicago, Illinois

Langacker R W 1986 An introduction to cognitive grammar. *Cognitive Science* **10**: 1–40

Langacker R W 1987a *Foundations of Cognitive Grammar. Vol. 1: Theoretical Prerequisites.* Stanford University Press, Stanford, California

Langacker R W 1987b Nouns and verbs. *Language* **63**: 53–94

Langacker R W 1988 Autonomy, agreement, and cognitive grammar. In: Brentari D, et al. (eds.) *Agreement in Grammatical Theory.* Chicago Linguistic Society, Chicago, Illinois

Langacker R W 1990a *Concept, Image, and Symbol: The Cognitive Basis of Grammar.* Mouton de Gruyter, Berlin

Langacker R W 1990b Subjectification. *Cognitive Linguistics* **1**: 5–38

Langacker R W 1991 *Foundations of Cognitive Grammar. Vol. 2: Descriptive Application.* Stanford University Press, Stanford, California

Rudzka-Ostyn B (ed.) 1988 *Topics in Cognitive Linguistics.* Benjamins, Amsterdam

SECTION XI

Special Applications — Phonetics and Translation

SECTION XI

Special Applications — Phonetics and Translation

Phonetics: Precursors to Modern Approaches

J. A. Kemp

It has often been maintained that linguistics, and by implication phonetics, only began in the nineteenth century, but this is far from the truth. This article will attempt to survey the development of the study of the sounds of speech and their formation, from the earliest times until approximately the end of the nineteenth century. East Asian traditions are considered in a separate article (see *History of East Asian Phonetics*).

1. Ancient India

Certain Sanskrit treatises, written during the first millennium BC give an astonishingly full and mostly accurate account of the mechanism of speech, and of the way speech sounds (in this case the sounds of Sanskrit) could be classified. One reason for the existence of these remarkable treatises relates to the importance which was attached to the reading of the religious books known as 'Vedas,' using the precise canonical pronunciation handed down from earlier times. The attempt to convey this resulted in a classificatory system for speech sounds which bears a very close resemblance to that of modern phonetics. The ancient Indian interest in phonetics is not confined to these treatises. The great Indian grammarian Pāṇini frequently dealt with phonetic matters in his *Aṣṭādhyāyī*, as did later commentaries (see *Pāṇinian Linguistics*; *Ancient Indian Phonetics*). This is in stark contrast to the virtual neglect of phonetics by the Greeks and Romans. The following account of Indian phonetics is heavily indebted to Allen (1953), which should be consulted for a more comprehensive description.

1.1 The Organs of Speech and Articulatory Processes

The treatises contain a set of technical terms for the various parts of the vocal tract—'articulators' (root, middle, and tip of the tongue, and lower lip) and 'place of articulation' (root of the jaw (=velum), palate, teeth, teeth-roots, upper lip).

Two main types of processes are described: (a) those occurring in the vocal tract between the larynx and the lips ('internal'); (b) those occurring elsewhere ('external'). The first of these relates closely to the modern term 'stricture,' specifying four degrees of closure between the articulators and the place of articulation: (i) 'touching' (=closure)—resulting in stops; (ii) 'opened'—giving vowels; (iii) 'slight contact'; and (iv) 'slight openness.' The last two relate to the semivowels, [j, r, l, ʋ], and to the fricatives, [ʃ, ʂ, s, ɸ, x, h, ɦ]. Most sources do not draw any distinction corresponding to 'close' and 'open' vowels, though some refer to contact being made in [i] and [u]. The distinction between vowels and consonants is based not only on stricture, but also on the syllabic function of vowels. The external processes are those relating to the larynx, lungs, and nasal cavity. The mechanism of voicing is for the most part poorly described in the Western tradition, at least before the eighteenth century. The Indian phoneticians' account, while not wholly accurate, is far superior. 'Breath' and 'voice' are distinguished according to whether the glottis is open or contracted, and there is an intermediate category between voiced and breathed, when the glottis is neither fully open nor contracted for voicing. This occurs in the Sanskrit sounds commonly transcribed as ⟨bh, dh⟩ etc. (namely, what is now called 'breathy voice,' though the existence of this category was vociferously denied by some Western scholars even as late as the nineteenth century).

Unaspirated and aspirated stops are distinguished by the lesser or greater amount of breath involved. Nasals are produced by opening the nasal cavity together with the appropriate articulations in the mouth, to give the nasal stops [m, n, ɲ, ɳ, ŋ], and also nasalized vowels and semivowels.

1.2 Points of Articulation

Six points of articulation are distinguished: (a) 'glottal,' or 'pulmonic,' producing [h and ɦ], whose similarity to vowels is emphasized; (b) 'velar'—'root of the tongue' against 'root of the upper jaw' (i.e., the velum) ([k, kh, g, gh, x]; (c) 'palatal'—middle of the tongue against the palate ([c, ch, ɟ, ɟh, ɲo, j, ʃ]); (d) 'retroflex' (*mūrdhanya*—literally 'of the head'—hence the terms 'cerebral' and 'cacuminal,' common in the nineteenth century), producing [ʈ, ʈh, ɖf, ɖh, ɳ, ʂ]; the curling back of the tongue tip is described, and the use of the underside of it. Some sources also include [r] here but elsewhere it is described as alveolar, or even as velar; (e) 'dental'—tip of the tongue against the teeth—[t, th, d, dh, n, l, s]; (f) 'labial'—[p, ph, b, bh, m, ʋ, ϕ].

The vowel system consists of short [a, i, u] and the 'consonant–vowels' [l, r], with the corresponding long [aː, iː, uː] and [rː]. [a] and [aː] are classed as 'glottal.' Allen (1953: 59) points out that ⟨a⟩ seems to have been regarded as a 'neutral' vowel—with unimpeded breath stream through the vocal tract, like [h]—apparently equated in some sources with 'pure voice,' so that the voicing in the voiced consonants can be described as 'consisting of ⟨a⟩.' [i] and [iː] are classed as 'palatal,' and [u] and [uː] as 'labial,' from the obvious rounding or protrusion of the lips (their velar component is not mentioned, but this is true of most early vowel descriptions, especially when the vowel system is small enough not to require this distinction to be made). [r, rː] and [l, lː] are described as part vowel and part consonant, presumably from their syllabic function. Finally, the treatises distinguish the diphthongs [ai, au] (described as 'glotto–palatal' and 'glotto–labial' respectively) and the vowels [e] and [o] (originally also diphthongs), which had a quality intermediate between [aː] and [iː]/[uː].

1.3 Prosodies

Here also the Indian phoneticians are far ahead of any Western counterpart prior to the eighteenth century in paying attention to features which characterize longer stretches of speech. It is significant that the Sanskrit term *sandhi* has been adopted in modern phonetics to refer to junction features. These features include modifications which take place at various boundaries—between words, morphemes, or sound-segments. At word and morpheme boundaries the treatises describe types of assimilation between final and initial segments, for example, of place or manner of articulation or of voicing, and the insertion of certain 'glides' to avoid hiatus between vowels. There is a description of the extent to which retroflexion may spread through words from a retroflex segment, and of the transitions between different types of segments, for example, the different types of stop release.

The syllable is defined as composed of a vowel with possible preceding consonant(s), and a possible following consonant if before a pause, and there are rules for syllable division. Vowel length is specified in units called *mātras* (cf. *moras*). Three distinct tone classes are distinguished; 'raised,' 'unraised' or 'low,' and 'intoned'—described by most sources as a combination of the first two, i.e., falling. The relative nature of the pitch difference indicated is clearly recognized. Allen (1953: 89–90) draws attention to the interesting connection made by some sources with possible physiological differences: the raised tone is said to be brought about by tenseness and constriction of the glottis, and the low tone by laxness and widening of the glottis.

2. Greece and Rome

2.1 *The Greek Philosophers*

The Greco–Roman tradition in the description of speech is relatively sparse, and is based more on auditory characteristics than on articulations. The sound-elements (called *grammata* or *stoikheia*) were divided by Plato (429–347 BC) into three groups: (a) those with *phōnē* (translatable as 'sonority')—the vowels; (b) those with neither *phōnē* nor *psophos* ('noise')—the stop consonants; and (c) 'intermediate' sounds, having *psophos* but not *phōnē*—[l m n r s] and the double sounds [dz] (or [zd]), [ks], and [ps]. Aristotle (384–322 BC) renamed the third group *hēmiphōna* 'half-sonorous.' He also attributed an articulatory feature *prosbolē* ('approach,' 'contact') to groups (b) and (c).

The Stoic philosophers distinguished three aspects of the *stoikheion*: (a) the sound; (b) the symbol used to represent it; (c) its name. These were translated later into Latin as aspects of *litera* (letter): *potestas*, *figura*, and *nomen*. Subsequent use of the word *litera*, or its equivalent in other languages is often ambiguous; sometimes its sense is not far different from that of the modern term 'phoneme' (see Abercrombie 1965: 76–85).

2.2 The Tekhnē Grammatikē

The *Tekhnē grammatikē* traditionally attributed to Dionysius Thrax in the first century BC, retained Aristotle's terminology for the three groups, but linked groups (b) and (c) under the term *sumphōna*—literally 'sounding with (the vowels),' i.e., consonants. The stop consonants (*aphōna*) were divided into three subgroups: (a) *psila* 'smooth,' 'unaspirated'—[p t k]; (b) *dasea* 'rough,' 'aspirated'—[ph th kh]; and (c) *mesa* 'intermediate'—[b d g], said, puzzlingly, to be midway between the other two groups on the scale of smooth–rough, and not linked with larynx activity. The Greeks had only a vague notion of the mechanism of voicing. Aristotle attributes it to the air striking the trachea, and Galen (129–?199 AD) later talks of it as 'breath beaten by the cartilages of the larynx' using the term *glottis* to refer to the top of the trachea.

The *Tekhnē* does not include any articulatory description of consonants or vowels, though it distinguishes long and short vowels. The category *hugra* 'moist,' used to refer to [l r m n], is later translated as 'liquid' (the origin of the term is not certain), and *sullabē* 'held together,' strictly used of consonant+vowel combinations but more loosely of vowels on their own, is the origin of the term 'syllable.' There are rules for syllable length relating to the length of the vowel and to the consonants that follow it. Tonal differences are marked respectively by acute, grave, and circumflex accents, which probably represented high, low, and falling pitches.

2.3 Rome

The Roman grammarians on the whole followed the Greek model: Latin *semivocales* (from Greek *hēmiphōna*) comprise ⟨l, m, n, r, f, s⟩ (not [w], [j], like the modern term 'semivowel'); the terms *mutae*, *vocales*, and *consonantes* are used for stops, vowels, and consonants respectively. The three Greek stop classes were preserved and translated as *tenues*, *aspiratae*, and *mediae*, in spite of the fact that Latin had no distinctively aspirated stops.

3. The Middle Ages: 'The First Grammatical Treatise'

In general there was little interest in phonetics in the medieval period (see Percival 1987). One major exception is the short work now known as the *First Grammatical Treatise*, written by an anonymous Icelandic scholar in the twelfth century AD with the intention of reforming the Icelandic spelling system. The title refers to its place in the manuscript which contained it. The writer was clearly well versed in the Latin tradition, and familiar with the adaptation of the Latin alphabet to English.

What is striking about the work is its accurate perception of phonological relationships. In order to determine the segments which must be differentiated in the writing system, the writer contrasts words with different meanings which differ only in respect of one of their sounds. Nine distinctive vowel sounds are identified, to which are allotted the letters ⟨a, e, i, o, u, ǫ, ę, ø, y⟩; eight of these are exemplified in the set: *sar*, *sǫr*, *ser*, *sęr*, *sor*, *sør*, *sur*, and *syr*, all of which have different meanings. Each of these vowels could have a long or a short value, and could be either oral or nasal. To mark this an acute accent was introduced for length, and a superscript dot for nasality. Thus the vowel in *far* (vessel) is short and in *fár* (danger) long; *hár* (hair) has a long oral vowel, *hȧ́r* (shark) a long nasalized vowel. This gave 36 possible vowel distinctions. Length in consonants could be shown by capital letters: *ǫl* (beer), *ǫL* (all).

The treatise shows astonishing linguistic insight, anticipating principles more closely associated with the twentieth century. Unfortunately it was not published until 1818, and remained almost unknown outside Scandinavia for many years.

4. Spelling Reform

During the Middle Ages Latin had dominated the linguistic scene, but gradually the European vernaculars began to be thought worthy of attention. Dante (1265–1321), in his short work *De vulgari eloquentia* 'On the eloquence of the vernaculars,' gave some impetus to this in Italy as early as the fourteenth century. The sounds of the vernaculars were inadequately conveyed by the Latin alphabet. Nebrija (1444–1522) in Spain (1492), Trissino (1478–1550) in Italy (1524), and Meigret (?1500–?1558) in France (1542) all suggested ways of improving the spelling systems of their languages. Most early grammarians took the written language, not the spoken, as a basis for their description of the sounds.

Some of the earliest phonetic observations on English are to be found in Sir Thomas Smith's (1513–77) *De recta et emendata linguae Anglicanae scriptione dialogus* 'Dialogue on the true and corrected writing of the English language' (1568). He tried to introduce more rationality into English spelling by providing some new symbols to make up for the deficiency of the Latin alphabet. These are dealt with elsewhere (see *History of Phonetic Transcription*). Smith was one of the first to comment on the 'vowel-like' nature (i.e., syllabicity) of the ⟨l⟩ in 'able, stable' and the final ⟨n⟩ in 'ridden, London.'

John Hart (d.1574), in his works on the orthography of English (1551, 1569, 1570), aimed to find an improved method of spelling which would convey the pronunciation while retaining the values of the Latin letters. Five vowels are identified, distinguished by three decreasing degrees of mouth aperture (⟨a, e, i⟩), and two degrees of lip rounding (⟨o, u⟩). He believed that these five simple sounds, in long and short varieties, were 'as many as ever any man could sound, of what tongue or nation soever he were.' His analysis of the consonants groups 14 of them in pairs, each pair 'shaped in the mouth in one selfe manner and fashion,' but differing in that the first has an 'inward sound' which the second lacks; elsewhere he describes them as 'softer' and 'harder,' but there is no understanding yet of the nature of the voicing mechanism. Hart's observations of features of connected speech are particularly noteworthy; for example, a weak pronunciation of the pronouns 'me, he, she, we' with a shorter vowel, and the regressive devoicing of word final voiced consonants when followed by initial voiceless consonants, as in 'his seeing, his shirt, have taken, find fault.' Like Smith, he recognized the possibility of syllabic ⟨l⟩, ⟨n⟩, and ⟨r⟩ in English (otherwise hardly commented on before the nineteenth century). His important contribution to phonetic transcription is dealt with elsewhere (see *History of Phonetic Tran-*

scription, Sect. 4.1). As a phonetic observer he was of a high rank.

5. The Beginnings of General Phonetics: Jacob Madsen

An important phonetic work appeared in 1586, written by the Dane Jacob Madsen of Aarhus (1538 86), and entitled *De Literis* 'On Letters.' Madsen was appointed professor at Copenhagen in 1574, after some years studying in Germany. He was familiar with a number of modern European languages as well as Greek, Latin, and Hebrew, and in spite of the title of his work he was not simply a spelling reformer. The term *litera* is used in a broad sense, including the sound as well as the symbol. Moreover he intended his work to cover the sounds of all languages; in this respect he can be described as the first to deal with 'general phonetics' and not just the sounds of a particular language. He placed considerable emphasis on direct observation, as opposed to evidence from earlier authorities, but was strongly influenced by Petrus Ramus (1515–72), the French philosopher/grammarian, and borrows extensively from his *Scholae grammaticae* (1569). Aristotelian influence is apparent in his two 'causes' of sounds—the 'remote' cause (*guttur*, 'throat') provides the 'matter' of sounds (breath and voice), and this is converted into specific sounds by the 'proximate' cause—the mouth and the nose. The mouth has a 'movable' part (the 'active' organ), and a 'fixed' part (the 'passive' or 'assisting' organ). The former comprises lower jaw, tongue, and lips, and the latter the upper jaw, palate, and teeth.

In common with earlier accounts Madsen divides the vowels into 'lingual' and 'labial,' remarking that their sound is determined by the varying dimensions of the mouth. He identifies three lingual vowels, ⟨a, e, i⟩, differing in mouth aperture—large, medium, and small respectively, and three labial, ⟨o, u, y⟩, having progressively smaller lip opening—⟨u⟩ and ⟨y⟩ also have more protrusion than ⟨o⟩. Madsen does not commit himself on the tongue position of the labials (one would need a glass covering of the mouth, he says, to observe it), and thinks it unnecessary to describe it because 'nature spontaneously adapts it to the sound.' Few early descriptions are able to improve on this. He distinguished two varieties of ⟨e⟩ and three of ⟨o⟩ (including Danish ⟨ø⟩).

The consonants are also divided into lingual and labial. Linguals are subdivided into 'linguopalatine' and 'linguodental.' Linguopalatines, for which the tongue is in a concave shape with its tip toward the palate, are further divided into 'movable' (tip not touching the palate—⟨s, r⟩) and 'fixed' (tip touching the palate and interrupting the airstream—⟨l, n⟩). For the 'upper linguodentals' the tip is against the upper teeth—⟨t, d⟩, and for the 'lower' the tongue has a convex shape, with the tip against the lower teeth, and some involvement of the inner part of the tongue. The 'lower interior' group includes ⟨h⟩ and ⟨c⟩ (=[k]), which he believed was articulated further back than ⟨g⟩ (=[g]). Madsen refutes the common assertion that ⟨h⟩ is not a letter but just a 'breath,' pointing out that it can distinguish different words, and he quotes its use in the postaspiration of vowels in Danish words such as *dah* 'then.' The 'lower exterior' group comprises ⟨j⟩ (=[j]) and ⟨g⟩. Labials are divided into 'labiodentals'—⟨f, v⟩, and 'labiolabials'—⟨p, b, m⟩. He believed that ⟨f⟩ had a more forceful articulation than ⟨v⟩, and was articulated further forward on the lower lip.

Madsen fails to distinguish oral and nasal sounds correctly, and leaves a number of gaps in his consonant description; for instance, he does not mention glottal stop, [ð] or [ɣ], although they occur in Danish. However, in spite of these deficiencies, his work constitutes a major landmark in the development of articulatory phonetic descriptions in the Western tradition.

6. The Seventeenth Century

The upsurge of scientific investigation and the general spirit of inquiry which pervaded the seventeenth century led to further advances in the understanding of language and speech. There was a continuing interest in spelling reform, stimulated by the spread of literacy. Alexander Gill (1565–1635) (*Logonomia anglica*, 1619), Charles Butler (1560–1647) (*The English Grammar*, 1634), Simon Daines (fl.1640) (*Orthoepia Anglicana*, 1640), and Richard Hodges (fl.1634–49) (*The English Primrose*, 1644), were among the English spelling reformers, often described as 'orthoepists.' Gill is unusual in devoting a substantial section to the variations found in different dialects of English, but neither he nor the others contributed substantially to the establishment of an improved phonetic framework, though they provided valuable evidence regarding contemporary pronunciations of English.

6.1 Robert Robinson

Robert Robinson's primary aim was to help foreign learners of English. *The Art of Pronuntiation* [sic], is divided into two parts: *Vox audienda*—the description of sounds, and *Vox videnda*—ways of transcribing sounds. In spite of his youth and lack of learning (for which he apologizes), he assures the reader that his book is based on his own experience. It contains some perceptive and novel ideas.

Part 1 gives an account of the vocal organs, contrasting the *motion* of air from the lungs with the *restraint* imposed by those organs through which the air passes (cf. Madsen's 'remote' and 'proximate' causes). The diversity of sounds arises from three aspects of this restraint—its instrument (the active articulator), its place, and its manner. He divides sounds into three categories—vowels, consonants, and 'the vital sound.' This is described as 'framed in the passage of the throat.' Without it, he says, all the other parts of the voice would be 'but as a soft whispering'; we can assume he is referring to 'voicing,' but he is vague and does not understand its origin. He distinguishes ten different vowel qualities, five short and five long, but only on one dimension—place of articulation; he does not mention aperture. The consonant classification is based on three places of articulation in the mouth—'outward,' 'middle,' 'inward'; and four manners—'mutes' (=stop), 'semi-mutes' (breath through the nose), 'greater obstricts' (stricture midway between mutes and lesser obstricts), and 'lesser obstricts' (stricture midway between greater obstricts and vowels). The 'peculiar' (the lateral) is well described, and the 'breast' consonant, though described as an 'aspirate,' may refer to the glottal stop. He says it involves 'a sudden stay of motion of the breath.'

In Part 2 Robinson provides a novel set of symbols, intended to convey the sounds unambiguously. There are two other interesting innovations in this part: (a) his use of a diagram depicting the palate, with indications of the tongue positions along it corresponding to his vowels; (b) his provision of a diacritic to mark the beginning of a syllable, and another to indicate the occurrence of the aspirate. The aspirate is thus treated as a prosodic feature: its diacritic is placed above the first letter of a syllable, but according to the direction in which it points it signifies either syllable initial or syllable final ⟨h⟩. This diacritic also functions to distinguish the voiceless member of pairs such as ⟨p/b⟩, ⟨t/d⟩ which otherwise share a common symbol. Robinson mentions tonal differences, but gives no explanation of how they are produced.

6.2 John Wallis

John Wallis (1616–1703) was one of the outstanding mathematicians of his day, and occupied the Savilian Chair of Geometry in Oxford for over 50 years. He was something of a polymath, and his accomplishments included skills in deciphering documents in the Civil War (1642–49), and teaching speech and language to the deaf. It was partly because of these interests that he decided to attempt a more thorough examination of speech. His general phonetic treatise, entitled *Tractatus de Loquela* 'Treatise on Speech,' was first published in 1653 in the same volume as his influential *Grammatica linguae Anglicanae* 'Grammar of the English Language.' He claimed to have been the first to set out the 'whole structure of speech systematically and in one place.' This was something of an overstatement, but certainly his high international standing made his book particularly influential.

Wallis lists the vocal organs and what he believes are some of their functions: the lungs are responsible for producing greater or less strength or sonority; the trachea determines differences of pitch between different voices; while the larynx is responsible for the normal pitch variation in speech and song, through a narrowing or widening of the *rimula* 'slit' within it, and also for the difference between whisper and 'full speech' (*aperta loquela*), through a 'tremulous vibration.' The nature and function of the vocal cords were still not known at this time, and Wallis's account is as accurate as one could expect, though less perceptive than Holder's (see Sect. 6.3).

For the vowels he proposes three places of articulation: 'labial,' 'palatal,' and 'guttural' (a division taken over from Arabic and Hebrew grammarians). This threefold place classification may at first sight resemble the 'front'/'central'/'back' categories of Melville Bell some centuries later (see Sect. 10.2 below), but whereas Bell's three categories referred to tongue positions, Wallis's labial refers only to lip posture. Like Madsen, he does not specify tongue positions for labials, and attributes the difference between the labial vowels [u] and [y] to a difference of mouth aperture rather than to back and front tongue positions. He also omits the French and German front rounded vowels [ø] and [œ] from his inventory. The mouth aperture, too, is divided into three degrees: wide, medium, and narrow, giving a total of nine vowels which Wallis believed could account for all the vowel sounds to be heard in languages. However, he concedes that since the aperture is a continuum it can be infinitely divided.

For the consonants also he is content to limit the places of articulation to three, and he has two strictures—'closed' (oral and nasal stops) and 'open' (continuants). To provide for the further distinctions necessary he introduces a category based on mouth aperture—'thinner' for [s, z, x] and 'rounder' for [θ, ð, h]. In distinguishing between the members of pairs such as ⟨p/b⟩, ⟨t/d⟩, ⟨f/v⟩, he is unwilling to accept that the difference originates in the larynx, and attributes it instead to different directions of the airstream. For ⟨f⟩, he says, it passes entirely through the mouth, for ⟨v⟩ it is equally split between nose and mouth, and for ⟨m⟩ it passes entirely through the nose. He had observed that whispered ⟨v⟩ and ⟨d⟩ are not identical with ⟨f⟩ and ⟨t⟩, but found the wrong explanation. In fact, for a whispered sound (in a technical phonetic sense) the vocal cords are brought closer together than for a voiceless sound, and this accounts for the difference perceived between the sounds.

It is rare to find these early writers on phonetics discussing the broad characteristics of different languages—what would now be called 'articulatory settings,' but Wallis has some interesting comments: 'The English push forward the whole of their pronunciation into the front part of the mouth … the Germans retract their pronunciation to the back of the mouth … the French articulate all their sounds nearer the [hard] palate and the mouth cavity is not so wide.'

In short, though not free of defects, as his contemporary Amman pointed out (see Sect. 7.1), Wallis presents a clear, articulatorily based description of speech which was an advance on previous classifications. The *Tractatus*, together with his account of English sounds in the first chapter of his *Grammar*, formed a valuable source, referred to in the nineteenth century by A. J. Ellis and Henry Sweet in their works on English pronunciation.

6.3 William Holder

Holder (1616–98), like Wallis, was a member of the Royal Society, and became Canon of Ely Cathedral and later of St Paul's. He shared Wallis's interest in teaching the deaf, and quarreled violently with him over the question of which of them had taught a deaf person to speak, both claiming credit for it. But it was this interest which led him to investigate speech, and to produce what is in many ways an outstanding work for its time—*Elements of Speech* (1669). He starts with a good description of the vocal organs, divided into a 'material' group (lungs, trachea, larynx, uvula, nose, arch of the palate—providing and transmitting breath and voice), and a 'formal' group (tongue, palate, gums, jaw, teeth, lips—forming the material into specific sounds). His description of the voicing mechanism is the best of his time: 'the larynx both gives passage to the breath and also, by the force of muscles, to bear the sides of the larynx stiff and near together, as the breath passes through the *rimula* ['slit'], makes a vibration of those cartilaginous bodies which forms that breath into a vocal sound or voice.' His 'material' organs provide the basis for four groups of sounds: breathed (i.e., voiceless) oral, voiced oral, breathed nasal, and voiced nasal.

He rejects the traditional criterion for distinguishing vowels from consonants, namely that only vowels can stand alone; consonants, unlike vowels, involve an 'appulse' or 'approach' of the vocal organs to each other. They are divided into 'plenary and occluse' (with complete closure) and 'partial and pervious' (without closure), the occluse consonants having three places of articulation—'labial' (p, b, m), 'gingival' (t, d, n) and 'palatick' (k, g, ng); and the pervious ones four—'labiodental' (f, v), 'linguadental' (th, dh = [θ, ð]), 'gingival' (s, z) and 'palatick' (sh, zh = [ʃ, ʒ]), a total of 17. ⟨l⟩ is described as having either a unilateral or bilateral airstream, and Holder gives an accurate account of the balance between muscle tension in the tongue and strength of airstream to produce the trilled ⟨r⟩. The logic of his system requires him to recognize the possibility of breathed as well as voiced nasals (though he calls them 'harsh and troublesome'), and also of breathed ⟨l⟩ and ⟨r⟩. He adds to these 'a stop formed in the larynx,' but believes that, like *h* ('only a guttural aspiration'), it is not an articulation. 'If it is relaxed,' he says, one gets a 'shaking of the larynx' (meaning possibly creaky voice, or possibly a uvular trill). He notices some language-specific features, such as the devoicing of final consonants in German, and the greater aspiration in the *Bocca Romana* 'Roman dialect.'

Holder's system contains eight vowels, classified by place—'guttural,' 'palatick,' 'labial-guttural' (= [w]) and 'labial-palatal' (= [y])—and by different degrees of aperture. Again, the way his analysis is structured means that each vowel can be short or long, nasal or oral, whispered or voiced, and (exceptionally for writers of this period) he points out that lip rounding can be added to any vowel. In two of the vowels he describes larynx lowering.

Although Wallis's international reputation made his work better known, Holder presents a more accurate overall description of the formation of speech sounds.

6.4 George Dalgarno and John Wilkins

Dalgarno (1626–87) and Wilkins (1614–72) are best known for their pioneering works on universal language. However, they had some interesting contributions to make to phonetic description. Dalgarno was born in Aberdeen, but spent most of his life as a private teacher in Oxfordshire. Descriptions of sounds are found both in the first chapter of his *Ars Signorum* (1661) and in his *Discourse on the nature and number of double consonants* (1680). He limits the sounds described to those needed for his own system, but there are some perceptive comments on structural combinations of sounds, such as the frequent occurrence of initial ⟨s⟩ in consonant clusters, and of ⟨l⟩ and ⟨r⟩ after stops in releasing clusters and before consonants in final clusters.

Wilkins was the son of an Oxford goldsmith, who became a distinguished academic and was appointed Warden of Wadham College, Oxford, and later Master of Trinity College, Cambridge and Bishop of Chester. He was one of a group of highly talented men who were founder members of the Royal Society. In his *Essay towards a Real Character and a Philosophical Language* (1668) he presents a well-organized framework for the pronunciation of his universal language, acknowledging his debt to Wallis, among others. The sounds are represented in a table, which shows the articulators involved and the various manner categories, mostly accurately distinguished. Wilkins keeps the traditional terms 'sonorous' and 'mute' for the pairs p/b, v/f etc., instead of following Wallis's analysis; however, he believed wrongly that the sonority was caused by the epiglottis. Like Holder, and unlike most other descriptions prior to the nineteenth century, he accepts the possibility of voiceless nasals. There are three different methods of transcribing sounds (see *History of Phonetic Transcription*, Sect. 4.1–4.2), and some comments on the characteristics of different languages, for example: 'the Italians pronounce more slowly and majestically, the French more volubly and hastily, the English in a middle way betwixt both' (classic English compromise!).

6.5 *Petrus Montanus*

Petrus Montanus (Pieter Berg) (1594/95–1638) is a curiously isolated figure, and appears to have been little known, perhaps because he wrote in Dutch. He produced a highly complex analysis of sounds entitled *De Spreeckonst* (The Art of Speech), published in Holland in 1635. The main influence he acknowledges was from Madsen, but his use of a series of dichotomies to classify the sounds, and his notion of speech as an imposition of form on matter are clearly Aristotelian. The organs of speech are divided into two types: (a) 'breathing' (lungs, trachea, and head cavities); and (b) 'forming' (throat, mouth, and nose), each type having its own muscle groups. The throat organs (or 'vessels,' as he calls them) include larynx, epiglottis, and uvula. The mouth is divided into 'inner' and 'outer'; inner includes the palate, gums, teeth, and tongue, outer consists of the front of the teeth and the lips. Palate and tongue are each subdivided from back to front, and the lips are divided into 'edge' and 'blade.' The place of articulation is known as the 'dividing door'; the cavity behind this is called the 'pipe,' and that in front of it the 'box.' The dividing door may be 'closed' or 'open,' and if open may be 'wide' or 'narrow.' A closed position gives oral and nasal stops (the nasals listed include the palatal), wide open gives vowels and fricatives [h, s, z, f, v, x, ɣ], and narrow gives trilled ⟨r⟩ and ⟨l⟩, the 'split' letter. Voicing is produced by the 'sounding hole' in the throat, which gives a 'smooth passage' to the air, while the 'rustling hole' causes the air to be impeded at some point (presumably giving fricative noise). The sounding hole may be combined with a rustling hole. Montanus claims to distinguish 48 vowel qualities found in languages, but his terminology is complicated and sometimes hard to interpret. This remarkably detailed and sophisticated analysis deserved to win wider recognition, but remained virtually unknown for over 300 years.

7. Doctors and Elocutionists

By the end of the seventeenth century, the anatomy and physiology of the vocal organs had been reasonably well described, though some areas were still obscure, notably the mechanism of voice. This deficiency was to be rectified in the eighteenth century.

7.1 *Conrad Amman*

Amman (1669–1730) was a Swiss-born doctor working in Amsterdam. Like Holder and Wallis he had practiced teaching the deaf, and had attained some fame through his earlier work entitled *Surdus Loquens* 'The Dumb Man Speaks' in 1692, setting out his method. In the preface to his *Dissertatio de Loquela* 'Treatise on Speech' (1700) he includes a letter of appreciation directed to Wallis, who had written to Amman with comments on the earlier book. Amman was apparently not acquainted with Wallis's *Tractatus* or with any other work on the subject when he wrote his own treatise, but comments in his letter on what he (correctly) saw as deficiencies in Wallis's account. These included the restriction of the vowels to nine by his oversymmetrical 3 × 3 classification, and his failure to recognize the nature of what Amman calls 'mixed' vowels, namely those represented in German by ⟨ü⟩, ⟨ö⟩, and ⟨ä⟩ which Amman interpreted as mixtures of ⟨e⟩ with ⟨u⟩, ⟨o⟩, and ⟨a⟩ respectively. He makes the perceptive comment that each vowel has a certain variability (Latin *latitudo*); it may be more open or more closed, but this 'does not change its nature.' Wallis had separated [j] and [w] (as consonants) from [i] and [u], because in words such as 'ye' and 'woo' the initial segments had a closer articulation than the vowels following them. Amman, however, includes this variation within the vowels' *latitudo*, which perhaps hints at an early notion of the phoneme. He makes sensible criticisms of three aspects of Wallis's treatment of consonants: (a) the failure to mention the explosion phase of stops; (b) his explanation of the difference between pairs such as ⟨v/f⟩ and ⟨z/s⟩ as due to different directions of the airstream rather than to the presence or absence of a *sonus vocalis* (vocal sound); and (c) his analysis of the sounds [ʃ, ʒ, ʧ, ʤ] as ⟨sy, zy, tsy, dzy⟩.

Amman's own framework of description was in other respects quite similar to Wallis's. The speech organs are divided into those that produce voice and breath, and those that form articulations—a similar division to Holder's. He criticizes the traditional idea that voice is produced simply by a narrowing of the chink (*fistula*) in the larynx; there must be 'a tremulous and quick undulation.' He had witnessed an anatomist who claimed to produce voice from a dead man's larynx, but did not find the demonstration convincing. The larynx is described in some detail—it consists of five solid cartilages, smooth and of great elasticity, connected by ligaments and small muscles, with nerves running from it to various parts of the body, including ribs and ears. When voice is required 'we breathe into the larynx muscles in such a way that they act on the cartilages and are balanced by them, resulting in an oscillatory and vibratory movement, which is conveyed to the air and to the bones of the head and makes it sonorous.' He compares it to a glass, set vibrating by rubbing with a wet finger, or to the vibration of the tongue in ⟨r⟩ or in a labial trill. Pitch changes are attributed to different length and thickness of the cartilages, and also to the actions of muscles of the larynx in raising it and narrowing the chink, or lowering it and widening the chink, to give higher or lower pitch respectively. Amman noted the close link between emotion and voice quality, which he believed to come from an original 'natural universal language,' now virtually lost.

His account of the articulators is also more anatomical than most, including reference to the tongue muscles, and the functions of the hyoid bone and the uvula. The various articulations of vowels and consonants are fully and accurately described, with comments on problems specific to the deaf. In all it is an impressive work.

7.2 The Mechanism of Voicing: Dodart and Ferrein

Although there had been reasonably accurate descriptions of the anatomy of the larynx, notably by Julius Casserius (1552–1616), no-one had so far understood the mechanism of phonation. Some, like Holder, had come close to it, but it was not until the early eighteenth century that experiments were made with excised larynxes. Denys Dodart (1634–1707) and Antoine Ferrein (1693–1769) were both medical doctors. Dodart published a series of articles in the *Mémoires de l'Académie de Paris* between 1700 and 1707, comparing the larynx to a stringed instrument. He talks about the vibration of the two 'lips' of the glottis, the change of length or of tension resulting in faster vibration and so higher pitch, and dismisses the idea that the trachea plays a significant part in pitch differences. However, it appears that when Dodart and Ferrein talk of the glottis they are referring not to the 'true' vocal folds but to the ventricular folds. In his 1707 article, Dodart drew a false analogy between the action of the vocal lips and the action of the lips in whistling (apparently he was an expert whistler), claiming that narrowing of the aperture necessarily led to a higher pitch.

In 1741 Ferrein published an article which anticipates the myoelastic theory of larynx vibration. He stated quite clearly that vibration is the essential factor, and that for this to start there must be an adduction of what he called the *cordes vocales* (the first use of this term). The larynx is defined as an *instrument à cordes et à vent*—that is, not to be classed purely either as a stringed instrument or a wind instrument. The *cordes vocales* or *rubans* are set in motion by the air (which acts like a bow on violin strings), and the vibration produces tones according to the laws of a stringed instrument. Ferrein dismissed Dodart's analogy with whistling, and maintained that changes of tension, not of aperture, cause the variety of tones. He established this through experiments using larynxes from cadavers, blowing air through them and varying their tension.

Further experimentation by Magendie (1824), Mayer (1826), and Johannes Müller (1801–58) in 1837 confirmed much of Ferrein's vibratory theory, and correctly identified the function of the true vocal folds. Subsequent to the development of the laryngoscope by Garcia (1856) and Czermak (1858), and the use of photography (e.g., by Hermann 1889) it became possible to produce conclusive evidence as to their mode of operation.

7.3 The Elocutionists

During the second half of the eighteenth century major contributions to the knowledge of human speech came from elocutionists. The demands for lessons in elocution at this time sprang from a growing awareness of the deplorable standard of public speaking and reading in churches, law courts, and in politics, and also of the advantages to be gained by speaking with a prestigious type of accent.

Two of the leading elocutionists were Thomas Sheridan (1719–88) and John Walker (1732–1807). Sheridan had been interested in oratory and in the promotion of the study of the English language from an early age. Starting his career as an actor, he later turned to lecturing and writing on elocution. Both he and Walker produced pronouncing dictionaries of English, and published descriptions of their systems of elocution, including, in particular, extended accounts of the nonsegmental aspects of speech, such as intonation, accent, emphasis, pause, and rhythm. Walker gave very detailed rules as to the intonation patterns of English, relating the various inflections to pauses and to grammatical constructions.

7.4 Joshua Steele

The most precise and detailed description of these nonsegmental aspects is to be found in *Essay towards Establishing the Melody and Measure of Speech*, published in 1775 (2nd edn. 1779) by Joshua Steele (1700–1791). Steele was asked by the President of the Royal Society to comment on certain remarks made by Lord Monboddo (1714–99) in a recently published book to the effect that tone, or pitch, had no part to play in English; accent, Monboddo had asserted, was conveyed simply by greater loudness. Having been interested for some years in 'the melody and measure of speech,' namely intonation and rhythm, Steele had done experiments in which he imitated intonation patterns using a bass viol. In his book he conclusively refuted Monboddo's statement, and set out his own system, far in advance of anything previously published, together with comments on it from Monboddo, who admitted his mistake.

Steele distinguished (to use his terms) 'accent,' 'quantity,' 'pause,' 'emphasis' (also called 'poise' or 'cadence'), and 'force,' that is, in modern terminology, pitch, duration, pause, salience (occurrence of the strong beat), and loudness respectively. He also provided a precise notation to indicate each of these characteristics. The duration of each syllable, and of each pause, is shown by using musical notes—semiquaver, quaver, crotchet etc., and the pitch movement by rising or falling oblique lines attached to the stalk of each note. These show the 'slides' of the voice, which he contrasted with the separate 'steps' of a musical scale. Sometimes the notes are placed on a stave, but more often they simply indicate the relative direction and extent of the pitch movement.

Steele noted some of the functions of pitch change, for example, to indicate completion by a final fall, noncompletion by a rise, and degrees of emotional involvement by the extent of the movement. In some utterances it can serve simply as an embellishment, or as an indicator of regional origin. 'Emphasis' is more complex. 'All speech,' he says, 'prose as well as poetry, falls naturally under emphatical divisions, which I will call cadences; let the thesis or pulsation, which points out those divisions, be marked by bars, as in ordinary music.' In each bar the pulsation, or thesis, is followed by an arsis, or remission. Sometimes the pulsation may fall on a pause rather than a syllable, and be followed by one or more syllables in the remission, as in the first and fifth cadences of the following:

| Of | man's | first disob | edience, | and the | fruit
Δ ∴ | Δ ∴ | Δ ∴ | Δ . . ∴ | Δ ∴ | Δ

where the symbol Δ indicates the point of pulsation. Each bar, he says, is composed of combinations of syllables, or syllables and pauses, making up the same total quantity. This springs from his belief that everyone has an 'instinctive sense of pulsation,' which is independent of the actual sounds. The terms 'heavy' and 'light' are used to refer to this mental sensation of what is emphatic or unemphatic. The 'rhythmus' or measure of speech is the 'number of cadences in a line or sentence.' Steele dismisses the popular link between 'force' and 'emphasis.' The term 'force' refers to loudness, but he points out that emphasis in his sense frequently falls on a period of silence.

Although there are some inconsistencies in Steele's notion of emphasis, his book represents a major advance in the description of nonsegmental aspects of speech. It enabled him to make a detailed transcription of the way in which the actor David Garrick delivered the well-known Hamlet soliloquy. John Walker's theory of inflections was almost certainly influenced by his knowledge of Steele's work, and in the nineteenth century there were lively arguments between traditional prosodists and those who adhered to Steele's 'temporal' approach to rhythm.

7.5 Christoph Friedrich Hellwag

C. F. Hellwag (1754–1835) published his *Dissertatio physiologico-medica de Formatione Loquelae* 'Physiological–medical Dissertation on the Formation of Speech' in Tübingen in 1781. He based his account of the anatomy and physiology of the vocal apparatus on *Elementa physiologiae corporis humani* 'Elements of the Physiology of the Human Body' (1757–66) by Albrecht von Haller (1708–77) and on his own observations. The dissertation contains what was apparently the first example of the 'vowel triangle' as a way of representing relationships between the vowel sounds:

u ü i
o ö e
å ä
a

The vowel ⟨a⟩ is described as the principal vowel, the basis of the rest when they are placed on what he calls the 'ladder,' while ⟨u⟩ and ⟨i⟩ form the upper extremities, and the other vowels are equally spaced between these three. The transition from ⟨u⟩ to ⟨i⟩ goes through ⟨ü⟩, and that from ⟨o⟩ to ⟨e⟩ through ⟨ö⟩, just as there is a theoretical point between ⟨å⟩ and ⟨ä⟩. Between these designated points an infinite number of others can be interpolated. Hellwag asks rhetorically 'Will it not be possible to specify all the vowels and diphthongs ever uttered by the human tongue by reference to their position [on the ladder], as it were mathematically?' He says he has determined their position not only auditorily, but also by observation of their articulatory formation, and gives a very detailed and mostly accurate description of tongue and lip positions. The way coarticulation occurs between vowel and adjacent consonant is noticed and exemplified by the variation between [ç] and [x], according to whether the vowel is front or back. The relative positions of the perceived pitches of whispered vowels (i.e., the formant resonances) are specified as (from lowest to highest): ⟨u, o, å, a, ä, e, i⟩, and Hellwag remarks on the change induced in these resonances by nasality. Diphthongs can be indicated on his 'ladder' by lines joining the starting and ending points, with the implication that a series of intermediate points must be traversed.

The description of consonants is accurate but less notable than that of the vowels. It includes descriptions of labial, alveolar, and uvular trills.

8. Early Developments in Experimental Phonetics

Experiments were carried out, as has been outlined, during the eighteenth century to try to illuminate the mechanism of the larynx. There was an increasing interest in trying to imitate the action of the vocal apparatus by the use of some sort of mechanical device. Hellwag mentions a number of early attempts to produce automata, none of which had any well-substantiated success, but there were two important enterprises of this kind in the late eighteenth century.

8.1 Christian Gottlieb Kratzenstein

In 1779 the Imperial Academy of St Petersburg specified the following questions as topics for its annual prize: (a) What is the nature and character of the sounds of the vowels A, E, I, O, U?; (b) Could one construct a device of a kind like the organ stop called 'vox humana' which would produce exactly the sound of these vowels? The prize was won by Christian Gottlieb Kratzenstein (1723–95), Professor of Experimental Physics and of Medicine at the University of

Copenhagen, a distinguished scholar, whose father was German and mother Danish. His prize essay, written in Latin, was published in 1781. He starts by giving an account of the mechanism of voice production. Like some earlier writers (e.g., John Wilkins), Kratzenstein believed that the epiglottis played a major part in phonation. He gives an interesting description of the physiological formation of the vowels, with precise measurements of the relative positions of the tongue in relation to the palate, the distances between upper and lower teeth, and the lip apertures for the different vowels, together with the positions of the larynx, and correctly notes both tongue and lip positions for the rounded vowels ⟨o⟩ and ⟨u⟩. Having described the 'normal' vowel positions, he points out that it is possible to vary the distance between the teeth without changing the vowel quality.

He proceeded to construct special cavities, or tubes, for each of the five vowels to be reproduced. The equivalent of the breath came from a bellows, and the glottal (or epiglottal) tone was provided by a metal reed, except in the case of ⟨i⟩ which operated more like a transverse flute, so that the air passed over a hole. Each vowel derived its quality from the air traveling through the variously shaped tubes. It appears that the sounds produced were recognizable, but Robert Willis (1800–75) showed later that it was not necessary to have tubes of such complex shapes to produce the desired result (see Sect. 8.3).

8.2 *Wolfgang von Kempelen*

Kratzenstein's 'tubes' were much less versatile, however, than the machine constructed by Wolfgang von Kempelen (1734–1804), which he describes in his book *Mechanismus der menschlichen Sprache nebst der Beschreibung seiner sprechenden Maschine* 'Mechanism of Human Speech together with the Description of his Speaking Machine' (1791). Von Kempelen was a man of many parts—lawyer, physicist, engineer, phonetician, and held a high position in the government of the Habsburg monarchy. He first started on his project of constructing a speaking machine in 1769, so it took him over 20 years to bring it to completion. One of the things which led him to attempt it was his interest in teaching the deaf. His book is in five parts, starting with more general questions about speech and its origins, and going on to describe the speech mechanism in detail, the sounds of European alphabets, and finally his machine. The account of the speech mechanism is excellent, with numerous diagrams, and amusing interludes, such as his description of three kinds of kiss. The vowels are characterized by reference to two factors: (a) the lip aperture; (b) the aperture of the 'tongue-channel'; he specifically rules out any participation in vowel production by the nose (i.e., nasal vowels) or the teeth. Each of the two apertures is divided into five degrees; going from narrowest to widest, the lip aperture gives U, O, I, E, A, and the 'tongue-channel' aperture I, E, A, O, U. These relationships were later seen to correspond with variations of the first and second formants respectively. It is clear from what von Kempelen says that he was able to perceive pitch differences (i.e., formants) in different vowels spoken on the same note.

The machine which he eventually devised and built was the culmination of several earlier unsuccessful attempts. He describes it in great detail, with accompanying diagrams (see *Early Modern Instrumental Phonetics*)—so precisely that attempts were made later, more or less successfully, to build it again on the basis of these directions.

The sounds produced (which included 19 consonants) undoubtedly left something to be desired in their intelligibility; von Kempelen himself says that if the hearer knows what word to expect it is more likely to seem correct; otherwise one might treat it like a young child who makes mistakes from time to time but is intelligible. Nevertheless, his book represents a major contribution to phonetic description and experimental research. The theory of speech acoustics was not yet understood, but the attempt to produce a satisfactory auditory output from a machine based on an articulatory model made several steps in the right direction.

8.3 *The Development of an Acoustic Theory of Speech Production*

Although there had been suggestions in earlier works that the differences between vowel sounds derived from changes in the shape of the vocal tract, brought about by movements of the tongue and lips, there was no theory to account for the differences prior to the nineteenth century. Among those who played a part in laying the foundations of such a theory were the German physicist E. F. F. Chladni (1756–1827), and the British physicists Robert Willis (1800–75) and Charles Wheatstone (1802–75).

Chladni published his important book *Die Akustik* 'Acoustics' in 1802 (later translated into French as *Traité d'Acoustique*), and *Über die Hervorbringung der menschlichen Sprache* 'On the Production of Human Language' in 1824. His vowel diagram is very similar to Hellwag's, except that it is reversed vertically, and has one extra central vowel:

	a	
ò	eù	è
ó	éu	é
ou	u	i

He described the three columns in articulatory terms: ⟨a–ou⟩ (=[u]) are said to have progressively decreasing lip aperture; ⟨a–i⟩ progressively decreasing mouth cavity size; ⟨a–u⟩ (=[y]) show a decrease in both.

Willis was familiar with the work of both Kratzenstein and von Kempelen. After attempts to verify von Kempelen's methods of producing vowels using similar apparatus, he decided that the way ahead did not lie in this direction. Instead, he commenced experiments using cylindrical tubes of differing lengths, with reeds fitted into one end. He discovered that by increasing the length he could produce the vowel series ⟨i, e, a, o, u⟩, without any change to the diameter or shape of the tube in any other way. Thus he showed that Kratzenstein's complex tubes were unnecessary. He also concluded that the vowel quality was independent of the note produced by the reed, and was due to the damped vibrations set up by reflections of the original wave at the extremity of the tube. This theory came to be known as the 'inharmonic' or 'transient' theory. Wheatstone repeated Willis's experiments, and found that there were multiple resonances. Not only would a column of air enter into vibration when it was capable of producing the same sound as the vibrating body causing the resonance, but also when the number of vibrations which it was capable of making was an integral multiple of those produced by the original sounding body—i.e., a harmonic. Thus a quality was added to the original sound, depending on the relationship of the frequency of vibration of that sound to the resonating frequency of the column of air.

The work of Willis and Wheatstone formed the basis for the vowel theory proposed by Hermann Helmholtz (1821–94) in *Die Lehre von den Tonempfindungen* (1863). He did experiments using resonators of various sizes to simulate the effect of the coupled resonances of the vocal cavity, and concluded that vowel quality was determined solely by the resonance frequencies of the vocal cavity. This reinforced the partial tones of the sound source which corresponded to its own resonances. His explanation comes to be known as the 'harmonic' theory of vowel production. He divides the vowels into two types: (a) ⟨u, o, a⟩; and (b) ⟨ü, ö, ä, i, e⟩, type (a) being characterized by one resonance, and type (b) by two resonances. The positions of the resonances correspond very closely to modern definitions of the first two formants. These would be very close together for the vowels included in type (a), and Helmholtz presumably could not separate them from one another. In the case of type (b) he assigns one resonance to the pharynx and the other to the mouth cavity.

Helmholtz's 'harmonic' theory was contested by Ludimar Hermann (1838–1914) (*Phonophotographische Untersuchungen*, 1889), who preferred Willis's 'inharmonic' theory. However, as Rayleigh (*The Theory of Sound*, 2nd edn. 1896) pointed out, the difference between the two theories is relatively unimportant. Both held that for specifying vowel quality the resonance frequencies of the vocal cavity were essential; supporters of the 'inharmonic' theory required in addition that there should be information about amplitude and phase of all the spectral components, but in fact, for vowels, this can be predicted from the resonance frequencies. Hermann was responsible for introducing the term 'formant.'

Relatively little work was done on the acoustics of consonants before the last quarter of the nineteenth century, when through the work of Charles Rosapelly (d.1913) and others, it became clear that there was a characteristic pitch associated with the transition from consonant to vowel.

9. Physiological Approaches to Speech in the Nineteenth Century

9.1 Karl Moritz Rapp

In his book *Versuch einer Physiologie der Sprache*, 'Essay on the Physiology of Speech' (4 vols., 1836–1841), Karl Moritz Rapp (1803–83) though taking physiology as his starting point, was concerned particularly with tracing the historical development of languages. He was well acquainted with the pioneering work of Rasmus Rask (1787–1832) and Jacob Grimm (1785–1863) in this field, and as well as his deep historical knowledge he brought to his work an exceptionally keen phonetic ear, and a wide knowledge of modern languages, notably French, Italian, English, and Spanish. He was a particularly harsh critic of the tendency of scholars of the time, notably Grimm, to rely unduly on the orthography in their study of speech, and this did not endear him to his contemporaries in Germany. In common with other nineteenth-century German scholars, including Grimm, Lepsius, and Thausing (though their interpretations varied considerably), Rapp drew an analogy between vowel sounds and colors, referring to Goethe's theory of color, which was based on the mixture of pigments. He held that just as the color gray represents an undifferentiated mixture composed of all the other colors, and can be placed in the middle of a triangle surrounded by them, so the vowel in the center of the vowel triangle is the *Urvokal*, or basic vowel, representing *unentwickelte Indifferenz* 'an undifferentiated neutral form' with respect to the distinctness of the vowels around it. In spite of the impressive scholarship which it shows, his book failed to win the recognition it deserves.

9.2 Ernst Wilhelm Brücke

Brücke (1819–92) was a distinguished physiologist and doctor who practiced in Vienna (see *Early Modern Instrumental Phonetics*). He had relatively little background in modern spoken languages, so his approach to the description of speech is not a linguistic one. He was perhaps inspired to do work in phonetics by his famous teacher Jan Purkyně (1787–1869). In his main work (*Grundzüge der Physiologie und Systematik der*

Sprachlaute 'Foundations of Physiology and Taxonomy of Speech Sounds,' 1856) he formulated a classificatory scheme which was intended to take in any possible class of sounds, but, unlike his contemporary Merkel, he kept the anatomical and acoustic material to a minimum. His description of the consonants is wholly articulatory in its basis, as one would expect, and is based on place and manner of articulation. He emphasizes the importance for anyone investigating language of being aware of the processes of production and not just the sounds which result from them. In the case of the vowels, however, he abandoned this approach, and attempted to class them by an acoustic criterion, based on resonances. The vowels are set out in a familiar triangular form, as follows:

$$\begin{array}{ccccccccc} & & & & a & & & & \\ & & & a^{e} & & a^{o} & & & \\ & & e^{a} & & a^{œ} & & o^{a} & & \\ & e & & e^{o} & & o^{e} & & o & \\ i & & i^{u} & & & & u^{i} & & u \end{array}$$

The status of the two center vowels in each of the two bottom lines is not at all clear. Even less clear is the basis of the distinction made between what Brücke calls the *vollkommen gebildete* 'completely formed' vowels and the 'incompletely formed' ones, which form a further complete set of 14. Most of the vowels of English are said to fall into this category. In addition he talks of an *unbestimmte* 'indeterminate' vowel, but, like Lepsius (1810–84), finds no place for it in his triangle. Sievers (1881) (see Sect. 11.1) and others have criticized his failure to deal with anything but sounds in isolation. However, in spite of these shortcomings, Brücke was thorough and accurate in his general treatment of speech, and his exposition has an admirable clarity. He put forward two systems of notation, one roman-based and the other nonroman (see *History of Phonetic Transcription*, Sect. 5.6).

9.3 Carl Ludwig Merkel

Merkel (1812–76) was Professor of Medicine in Leipzig. His *Physiologie der menschlichen Sprache* 'Physiology of Human Speech' (1866) was an improved and enlarged version of an earlier work. While he shared with Brücke the same background and approach to speech description, he lacked the discrimination which enabled Brücke to present the essentials in such a relatively precise and clear form. Merkel's book contains a somewhat forbidding mass of anatomical and physiological detail in its 1,000 or so pages, from which it is not easy to extract the more valuable phonetic contributions. His knowledge of foreign languages was extremely limited, and many of his observations spring from his own Saxon dialect. One of his more serious failings was his misunderstanding of the mechanism of voicing, which led him to say that no obstruent consonant has vibration of the vocal cords; hence [b, d, g] and [p, t, k] are distinguished as having respectively a closed and an open glottis. On the other hand his treatment of the nonsegmental aspects of speech, including phonotactics, rhythm, and pitch variation, showed a keen observer's ear, and filled the gap which Brücke had left. He also, like Brücke, devised a nonroman transcription system, which he claims is more complete, in that Brücke omitted from his notation vowel sounds which he could not illustrate from languages, and sounds whose physiological formation he did not understand, such as the clicks of southern African languages.

9.4 Moritz Thausing

Thausing (1838–84) relied heavily on Brücke's *Grundzüge* as a basis for his own system—*Das natürliche Lautsystem der menschlichen Sprache* (1863). It is based on the postulate that sounds make up a unified system, which has its starting point in what he calls the *Naturlaut*, that is, the vowel ⟨a⟩. This, he believes, is the sound with the least articulatory interference in its mode of production, and the greatest intensity—the sound which is the earliest and easiest for humans to produce. All other sounds are departures from this, involving a greater degree of *Verdumpfung* 'dampening.' He arranges the 22 basic sounds in a hierarchical order, departing from ⟨a⟩ in 3 different directions, each branch containing 7 'grades' of sounds, decreasing in intensity (*Tonstärke, Schallstärke*) as they get further from the *Naturlaut*. The nasal consonants are at the extreme, being most 'colorless.' The three series are as follows (Thausing actually arranges them on the model of a pyramid, with ⟨a⟩ at the top):

1. ⟨a o u w f p b m⟩
2. ⟨a e i j ch (=[x]) k g γ(=[ŋ])⟩
3. ⟨a l r s(=[z]) ß(=[s]) t d n⟩

The different 'grades' of sounds are subject to minor variations in quality to account for national and individual varieties. At their boundaries they merge imperceptibly with their neighbors. The sounds can only be defined in relation to their place in this system.

Thausing acknowledged his debt to Hellwag (see Sect. 7.5) in giving ⟨a⟩ this position of prominence. The ancient Indian phoneticians had also regarded it as basic to the other vowels (see Sect. 1.2). However, perhaps the most significant of Thausing's insights was not the system itself, but the notion of a hierarchy of sounds of steadily decreasing 'intensity' or 'resonance.' He emphasized that just as only one syllable has prominence (*den Hauptton*) in the word, so only one sound has prominence in the syllable. Each sound has a certain potentiality to take this prominent role in the syllable. Whether it does so or not depends not on its inherent nature, but on its position in the hierarchy relative to other adjacent sounds in the syl-

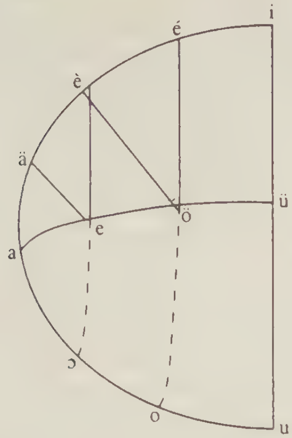


Figure 1. Vowel diagram by F. Du Bois-Reymond.

lable. It is not only vowels in the traditional sense that can play this role, but frequently also liquids. He therefore coined the term 'sonant' to refer to this prominent sound, and 'consonant' for the nonprominent sounds in the syllable. This functional approach to the syllable in terms of the relative sonority of its components influenced Sievers's syllable theory, as he acknowledged (see Sect. 11.1). Thausing also put forward a new notation system (see *History of Phonetic Transcription*, Sect. 5.6).

9.5 Félix Du Bois-Reymond

Du Bois-Reymond's (1782–1865) *Kadmus* only appeared in his 80th year, but it was the culmination of a lifetime's interest in language. He had published articles on the vowels (*Neue Berlinische Monatschrift*, 1811) and consonants (*Musen*, 1812), intended to be part of the larger work, but circumstances prevented its publication before 1862. Only encouragement from Brücke, in particular, stimulated him to complete this work. It is a comprehensive account of the acoustics, articulatory basis, and graphic representation of speech. For much of it he was dependent on earlier writers, whose influence he acknowledges—Hellwag, Chladni, Merkel, Brücke, Helmholtz, Lepsius, and others. Perhaps the most interesting aspect of his work is his vowel diagram. Instead of the triangular shape, favored by Hellwag and Chladni, with ⟨a⟩ at the top or the bottom and regarded in some sense as the most basic vowel, Du Bois-Reymond makes ⟨u⟩ and ⟨i⟩ the two extremes in the vowel sequence, with ⟨a⟩ as a somewhat movable mean between them. His diagram is semicircular, with a vertical diameter because he believed that this reflected the respective high and low resonances of ⟨i⟩ and ⟨u⟩, whereas the more usual diagram put them both at the top or bottom of a triangle (see Fig. 1).

10. Phonetics in Britain in the Nineteenth Century

The study and teaching of elocution continued to stimulate advances in phonetics (see Sect. 10.2), but another powerful stimulus was provided by concern about systems of transcription.

10.1 Alexander John Ellis

A. J. Ellis (1814–90) was responsible for laying the foundations of phonetic studies in Britain. A legacy bestowed on him early in his life made it possible for him to devote a large part of his time to study and research. He obtained a first class degree in mathematics at Cambridge, but he also had strong interests in music and in philology, and during his travels in Europe he became interested in the Italian dialects. This led him to try to devise a system of transcription to record the different sounds. In 1843 he heard about the work of Isaac Pitman (1813–97) who had by then developed the system of shorthand which was to become world famous, and in spite of their very different backgrounds (Pitman came from comparatively humble origins, and had left school at an early age) they struck up a successful partnership, aimed at reforming English spelling. Ellis determined to make himself thoroughly familiar with the existing phonetic literature, and in his early work acknowledges a particular debt to K. M. Rapp (see Sect. 9.1). He acquired a good knowledge of languages, and following these early studies published *The Alphabet of Nature* (1845), and, what was effectively a substantial revision of it, *The Essentials of Phonetics, containing the theory of a universal alphabet* (1848) (printed in the Phonotypic transcription devised by Pitman and Ellis). Both of these books were intended to provide a basis for a new transcription system (see *History of Phonetic Transcription*, Sects. 5.2, 5.5). However, his most substantial work was *On Early English Pronunciation* (EEP) (5 vols., 1869–89). Bell's *Visible Speech* (1867) (see below) led him to change some of his earlier ideas, though he did not adopt Bell's system as a whole. EEP was intended primarily as a treatise on the history of the sounds of English, but it contains in addition an amazingly rich collection of information on the physiology of speech and on contemporary English pronunciation, summing up the results of earlier work, both of the German physiologists, and of Melville Bell. Ellis's observations and analyses inevitably contain errors, but one can have nothing but admiration for the enormous amount of sheer hard work that went into these five volumes, the extent of his scholarship, and the fineness of the analysis of the dialectal sounds, which he records in his Palaeotype transcription. A sixth volume was planned, to provide a much-needed summary and index, but regrettably the author's death prevented its completion. In an abridged version of volume five, entitled *English dialects, their sounds and homes* Ellis used 'Glossic,' a simpler transcription, based on English orthography, instead of the more complex Palaeotype. A very readable exposition of his ideas is contained in *Pronunciation for Singers* (1877).

10.2 Alexander Melville Bell

Bell (1819–1905) was a Scot, the son of an elocution teacher, and in due course became principal assistant to his father. Between 1843 and 1870 he lectured in elocution at London and Edinburgh universities, running courses for native speakers, foreigners, and for those suffering from speech problems. This gave him a detailed knowledge of a wide variety of different sounds. After visiting the USA to lecture in 1868 he emigrated to Canada in 1870, and carried on his teaching there and in the United States, becoming an American citizen in 1897.

His most influential work was *Visible Speech, the Science of Universal Alphabetics, or self-interpreting physiological letters, for the writing of all languages in one alphabet* (1867). His idea was to provide a framework which would accommodate all the various sounds that can be produced by the human vocal organs, including even interjectional and inarticulate sounds, and a notation designed to suggest to the user the way in which the sounds concerned were formed (that is an 'iconic' notation—see *History of Phonetic Transcription*, Sects. 4.2, 5.7). Bell first advertised his system in 1864, with public demonstrations, and attempted to persuade the British government to give its support to it as a way of simplifying the bewildering inconsistencies of the English orthography, and providing 'a sound bridge from language to language,' but he was unsuccessful in this. However, his analysis of speech sounds, and in particular of the vowels, had a major impact on the subsequent development of phonetics, even though it was not widely known outside his own circle.

The new system was intended to identify clearly the respective parts played in determining vowel quality by the movement of the tongue, and the lips, and any other factors. Too many earlier descriptions had failed to separate out the contributions made by these various components. Bell's attention was, therefore, inevitably focused on the articulatory, and not the acoustic aspect of vowel production. He divides the vowel space into three horizontal ('back,' 'front,' 'mixed') and three vertical ('high,' 'mid,' 'low') categories. The horizontal division is defined according to the position of the raised part of the tongue in relation to the palate—mixed category involves raising both the back and front of the tongue. The vertical division relates to the height of the tongue. Each of these tongue positions can be accompanied by rounded or unrounded lips. This gives a total of 18 cardinal vowel types, to which he added a further division into 'primary' and 'wide,' making a total of 36 vowels. Bell explained primary and wide as follows:

> Primary vowels are those which are most allied to consonants, the voice channel being expanded only so far as to remove all 'fricative' quality. The same organic adjustments form 'wide' vowels when the resonance cavity is enlarged behind the configurative aperture;—the physical cause of 'wide' quality being retraction of the soft palate, and expansion of the pharynx.

The basis for this distinction was subsequently changed by Sweet (see Sect. 10.3), who also changed the terms to 'wide' and 'narrow,' but it did not win general acceptance. Sweet said of Bell's classification 'Bell's analysis of the vowels is so perfect that after ten years incessant testing and application to a variety of languages, I see no reason for modifying its general framework.' Bell's own diagrams of the vowel articulations suggest that his distinctions may well be based on auditory impressions rather than articulatory evidence, or perhaps on proprioceptive sensations of muscular activity.

His analysis of the consonants and prosodic features broke less new ground, though there are many interesting comments to be found in his works. The consonants are divided into four places of articulation: (a) 'lip' (labial); (b) 'point' (formed by the point of the tongue and, generally, the upper gums or teeth); (c) 'front' (formed by the front (middle) of the tongue and the roof of the mouth); and (d) 'back' (formed by the root of the tongue and the soft palate). They are further divided into four different 'forms': (a) 'primary' (narrowing without contact—fricatives); (b) 'divided' (middle of the passage stopped, sides open—laterals); (c) 'shut' (complete closure of the mouth passage—stops); and (d) 'nasal' (complete closure of the mouth, the nose passage being open—nasals). Further subdivisions of both place and form were possible, partly by using the category 'mixed,' which allowed two places of articulation (e.g., point and front), and partly by modifiers (front/back, close/open). In addition the sounds could be voiced or voiceless. In spite of the undoubted success which Bell and his pupils clearly had in using the system, his exposition of it in *Visible Speech* was far from easy to follow for those nonspecialists who had to rely purely on his somewhat sparse descriptions of the sounds.

10.3 Henry Sweet

Sweet (1845–1912) was perhaps the greatest nineteenth-century phonetician, and had an equal, if not greater, reputation as an Anglicist. He was one of Bell's pupils, and made himself fully familiar with the works of other British and foreign writers on phonetics such as Ellis, Merkel, Brücke, Czermak, Sievers, and Johan Storm. He was always guided by his belief that it was vital to have a firsthand knowledge of the sounds of languages, and this is reflected in his detailed studies of the pronunciation of Danish, Russian, Portuguese, North Welsh, and Swedish in the *Transactions of the Philological Society* from 1873 onward, and of German, French, Dutch, Icelandic, and English in his *Handbook of Phonetics*, published in 1877. This was his first major work on general phonetics. He emphasizes in the preface that phonetics provides 'an indispensable foundation of all study of language,' and deplores the current poor state of language teaching and the lack of practical study of English pronunciation in schools. 'Phonetics,' he says, 'can no more be acquired by mere reading than music can.' It must be learnt from a competent teacher, and must start with the study of the student's own speech. Bell, he believed, 'has done more for phonetics than all his predecessors put together,' and as a result of his work and Ellis's, 'England may now boast a flourishing phonetic school of its own.' He criticizes the German approach to vowel description for focusing entirely on the sounds, without regard to their formation, and for the resulting 'triangular arrangement of the vowels, which has done so much to perpetuate error and prevent progress.' Several examples of the triangular diagram being used to indicate the relationships between vowels have been given, beginning with Hellwag. Du Bois-Reymond departed from this, and Bell's system led to the vowel quadrilateral as an alternative. However, as Viëtor points out, Bell uses a vowel triangle elsewhere, so his choice of the quadrilateral in *Visible Speech* relates more to the character of his notation than to a basic difference in interpretation of the vowel area. For a discussion of various nineteenth-century vowel schemes see Viëtor (1898: 41–65) and Ungeheuer (1962: 14–30).

The *Handbook* was a response to a request from Johan Storm (1836–1920), the outstanding Norwegian phonetician, for 'an exposition of the main results of Bell's investigations, with such additions and alterations as would be required to bring the book up to the present state of knowledge.' Sweet's *Primer of Phonetics* (first published in 1890) was intended in part as a new edition of the *Handbook* and in part as a concise introduction to phonetics, 'rigorously excluding all details that are not directly useful to the beginner.' The changes from the *Handbook* are relatively few, but he made some further changes in later editions of the *Primer*. The following brief account refers to his final system.

Sweet has a short section on the organs of speech, and then goes on to what he calls 'analysis.' This starts with the 'throat sounds,' and the categories 'narrow' and 'wide' (modified from Bell's 'primary' and 'wide'). Sweet attributes this distinction not to differences in the pharynx, but to the shape of the tongue, and, unlike Bell, he applies it to consonants as well as vowels. For narrow sounds he maintains that the tongue is comparatively tensed and 'bunched,' giving it a more convex shape than for the wide sounds. He adopts Bell's classification for the vowels, but introduces a further distinction, between 'shifted' and normal vowels, giving 72 categories in all. The shifted vowels are said to involve a movement of the tongue in or out, away from its normal position (front, mixed, or back), while retaining the basic slope associated with this position, but few, if any, phoneticians have found this a satisfactory category.

The consonant classification is also based on Bell, but with some modifications. 'Lip,' 'point,' 'front,' and 'back' are retained, but a further category 'blade' is added and also 'fan' (spread), to characterize the Arabic 'emphatic' consonants. Sweet preferred to use the active articulator to define the place, rather than the passive, as in modern terminology. Bell had somewhat curiously classed [f] [v] as 'lip-divided,' and [θ] [ð] as 'point-divided' (i.e., lateral) consonants; for Sweet the first pair are 'lip-teeth,' and the second pair 'point-teeth.' He also added an extra 'form' category, namely 'trills.' Each place of articulation could be further modified forward (outer) or backward (inner), and there are two special tongue positions: 'inversion' (in later terminology called 'retroflexion'), and 'protrusion' (tongue tip extended to the lips).

His next section is entitled 'Synthesis,' and follows the example of Sievers (see Sect. 11.1) in looking at the characteristics of sounds 'in a stream of incessant change.' These characteristics include variations in the relative force (stress), quantity, tone, and voice quality of parts of the utterance, but notably the 'glides' (a term which he borrowed from Ellis)—the transition from one sound to another. In the case of vowels, this included the aspirate on-glide ⟨h⟩ and glottal stop, as in [hat] and [ˀat]. Consonant glides accounted for the variations of voicing and aspiration in stops, e.g., between [aka], [akha], [agha], and [aga]. The final section of the *Handbook* is on sound notation and introduces his *Romic* transcription. This was subsequently revised in his article 'Sound Notation' (1880–81) (see *History of Phonetic Transcription*, Sect. 5.8).

Sweet's work had a widespread impact on the development of phonetics in Britain and abroad. The essentially pragmatic approach which he shared with Bell and Ellis contrasted with the more theoretical approach of continental scholars. In due course the crucial importance of practical work with languages and of careful observation and recording of sounds came to be recognized by phoneticians throughout Europe. Sweet combined this practical approach with an ability to extract from the multiplicity of his phonetic observations a clear general phonetic system, and to express this system clearly and concisely. Jespersen, indeed, found him too concise, and looked for more explanation or justification for some of his statements, while admiring his 'clarity, sharp observation, and ability to grasp the central and most crucial elements, and to leave the rest on one side.' He attributes Sweet's avoidance of lengthy discussions or explanations to his concern for the nonspecialist reader, who would only be confused by discursive accounts of the background and other competing views, and sees this as a reaction to the German phoneticians, who had often gone to the opposite extreme.

11. Phonetics in Germany in the Nineteenth Century

11.1 Eduard Sievers

Sievers (1850–1932) published his *Grundzüge der Lautphysiologie* in 1876. He saw it as a continuation of the work of Merkel and Helmholtz, that is, as a scientific (physiological and physical) development of the study of speech. It was an advance on the previous German work, giving more attention to details of individual languages, but it was still more theoretical than practical in its approach. The second edition appeared in 1881, entitled *Grundzüge der Phonetik*. In this the influence of what was being called the English–Scandinavian School (notably Bell, Sweet, and Storm) was apparent. Sievers abandoned his previous vowel system and adopted Bell's articulatory scheme, praising the practical approach that Bell had pioneered, though he still believed that the starting point should be an analysis of individual languages, rather than a scheme encompassing all possible sounds. He put more emphasis on the phonetics of the sentence, including the glides between sounds, and the identification of the syllable. There is also an increasing emphasis on the importance of looking at the way sounds operate within a system.

By the third edition (1885) Sievers had decided to concentrate on the linguistic aspects of phonetics, because he thought it was impossible to combine this in one book with the physical and physiological aspects. The full title, *Grundzüge der Phonetik zur Einführung in das Studium der Lautlehre der indogermanischen Sprachen*, underlines his objective to provide the basis for a detailed investigation of the earlier stages of the Indo-European languages, rather than to provide a treatise on the theory and practice of phonetics. Nevertheless, he still promoted the practical articulatory approach of Bell and Sweet, and the need to study living languages (see *Early Modern Instrumental Phonetics*).

11.2 Moritz Trautmann

Trautmann (1842–1920) was not an admirer of the English–Scandinavian School. In his book, *Die Sprachlaute* 'The Sounds of Speech' (1884–86), he rejected Bell's vowel scheme because of its articulatory approach and attempted to replace it with an acoustically based analysis. However, although this is now a fully acceptable method of analyzing vowels, at that time the difficulties of identifying vowel resonances precisely were still considerable. In addition, Trautmann frequently gives very little, if any, indication of the precise vowels to which he is referring, and is content to construct a theoretical scheme with little, if any, exemplification from languages. This makes his system very difficult to follow. One of his objectives was to found a German school of phonetics, and he attempted to replace existing terminology with a new German-based one, but only a few of his terms (such as *stimmhaft*, 'voiced,' and *stimmlos*, 'voiceless') have become established.

11.3 Wilhelm Viëtor

Viëtor (1850–1918) was less of a theorist than a practical phonetician. In this capacity he made a most important contribution to the teaching of phonetics in Germany. His *Elemente der Phonetik* 'Elements of Phonetics' (1st edn. 1884) was highly successful and was frequently republished (the 7th edn. in 1923, after his death). He was a pioneer in the movement to improve the standards of language teaching in schools, and saw the crucial contribution that phonetics could make to this. He was also, with Passy and Sweet, one of the leading figures in the Phonetic Teachers' Association, which later became the International Phonetic Association (IPA). Viëtor for the most part accepted the practical tradition of Bell and Sweet, and provides a valuable survey of the work of his predecessors in the early part of his book.

11.4 Friedrich Techmer

Techmer (1843–91) started his academic life as a scientist, and his aim was to link together the scientific and linguistic aspects of the study of speech. He had a much wider knowledge of languages than the earlier physiologists like Brücke, and with the increasing sophistication of experimental phonetic techniques at the end of the nineteenth century the time was ripe for an overall survey, linking auditory and articulatory phonetics with the experimental approach. Techmer did a great deal to stimulate interest and research in phonetics by founding the *Internationale Zeitschrift für allgemeine Sprachwissenschaft* (IZ), which began in 1884 but ended with his death in 1891. In the first issue he gave a valuable survey of the experimental techniques being used to investigate speech, with precise definitions of German technical phonetic terms (see *Early Modern Instrumental Phonetics*), which he had introduced (more successfully than Trautmann). However, the contribution of his own work to phonetics was regrettably not as great as it promised to be. Contemporary phoneticians, such as Sweet and Storm, were particularly critical of the fact that he did not support his attempt to establish a scientific basis for phonetics with actual data from languages, and of his general lack of clarity and explanation. Techmer was highly critical of the mistakes he claimed to have detected in the works of Bell and Passy, but seems to have been unaware of the improvements made to Bell's system by Sweet. His attacks were hard to respond to because they were often phrased in general terms, without specific examples from languages to support them, though Techmer claimed that all his statements were based on personal observation of the pronunciation of individual speakers, not on theoretically possible sounds. His later works, on specific languages and dialects, are better supported (for his system of notation, see *History of Phonetic Transcription*, Sect. 5.9).

12. Paul Passy and Otto Jespersen

The justification for linking together Passy (1859–1940) and Jespersen (1860–1943) in one section is that while neither of them was responsible for a major advance in phonetic theory, they both contributed very considerably to the progress of phonetics through their conviction of its importance and their practical teaching.

Both were closely involved in the founding of the IPA, and in the movement to bring phonetics into language teaching. From 1890–1927 Passy was Secretary of the IPA, following his brother Jean, who had been the first Secretary. Passy had a high reputation for his lectures and for the clarity of his exposition. Among his publications *Les Sons du français* (1887) is the most significant. In 1892 he won the Volney Prize for an essay entitled *Etudes de changements phonétiques*.

Jespersen's contributions to linguistics range much more widely, but phonetics was always one of his strongest interests (see Rischel 1989). He met Viëtor, Ellis, Sweet, Sievers, and Passy soon after leaving university, and acknowledges a great debt in particular to Sweet, but also to the Scandinavians Vilhelm Thomsen, Karl Verner, Herman Møller, and Johan Storm. He was a good mathematician, and this may have led him to propose his analphabetic system of notation in *The Articulations of Speech Sounds* (1889), which also attempted to give a more precise form and reference to phonetic terminology (see *History of Phonetic Transcription*, Sect. 5.9). It was generally welcomed as providing objective reference points, which could be used to illuminate the competing descriptive systems of Bell, Trautmann, Sweet, and others, even though its very precision made heavy demands on the skill of the observer. His main phonetic work was published first in Danish, *Fonetik*, *en systematisk fremstilling af læren om sproglyd* (1897–1899), and later republished in German in shorter form, *Phonetische Grundfragen* and *Lehrbuch der Phonetik* (both 1904). He was scrupulous in familiarizing himself with all the previous literature, and had searching observations and criticisms to make of them. He also produced a dialect notation for Danish, and was foremost in promoting the Copenhagen Conference on phonetic transcription in 1925, though he never adopted the IPA alphabet for his own use.

13. Phonetics at the End of the Nineteenth Century

The discipline of phonetics was firmly established by this time, in spite of inevitable differences in classificatory schemes, terminology, and systems of transcription. The major source of disagreement related to the increasing use of experimental techniques of analysis (see also *Early Modern Instrumental Phonetics*). Laryngoscopy, kymography, palatography, and sound recording were all being employed, notably by Abbé Rousselot (1846–1924) in Paris (*Principes de phonétique expérimentale*, 1901–1908), but many phoneticians, among them Sievers, Sweet, and Jespersen, were critical of the attention being given to these techniques. They were not willing to accept results produced by machines as convincing evidence in themselves. This is understandable, in view of the comparatively crude nature of some of the devices used. Sweet's comment in his article for *Encyclopædia Britannica* (11th edn. 1911) sums it up:

> It cannot be too often repeated that instrumental phonetics is, strictly speaking, not phonetics at all. It is only a help: it supplies materials which are useless till they have been tested and accepted from the linguistic phonetician's point of view. The final arbiter in all phonetic questions is the trained ear of a practical phonetician.

The arguments went on for many years after that, and even in the late twentieth century have not been fully resolved. As Kohler (1981) points out in his article on nineteenth-century German phonetics, there is still in many cases a division between the linguistic and the more technical or scientific aspects of phonetics, which urgently needs to be bridged in order to confirm it as a unified and independent discipline. Jespersen's hopeful words, written at the turn of the century (1905–06: 80) are worth quoting, in conclusion. After summarizing the various things that have led people to the study of speech, he goes on:

> While previously all these different men worked for themselves, without knowing very much about the others who, in a different way, were interested in the same objectives, in recent times they seem more and more to be converging, and to be making common cause with one another, so that each one in his own area is aware of the activity of the rest, and has the strong feeling, that for the building which is to shelter the science of human speech, stones must be hauled together from many different directions.

Bibliography

Abercrombie D 1965 *Studies in Phonetics and Linguistics*. Oxford University Press, London

Abercrombie D 1991 *Fifty Years in Phonetics: Selected Papers*. Edinburgh University Press, Edinburgh

Abercrombie D 1993 William Holder and other 17th-century phoneticians. *Historiographia Linguistica* **20(2–3)**: 309–30

Allen W S 1953 *Phonetics in Ancient India*. Oxford University Press, London

Asher R E, Henderson E J A (eds.) 1981 *Towards a History of Phonetics*. Edinburgh University Press, Edinburgh

Austerlitz R 1975 Historiography of phonetics: A bibliography. In: Sebeok T A (ed.) *Current Trends in Linguistics*, vol. 13. Mouton, The Hague

Firth J R 1946 The English school of phonetics. *Transactions of the Philological Society*: 92–132

Fischer-Jørgensen E 1979 A sketch of the history of phonetics in Denmark until the beginning of the 20th century. *Annual Report of the Institute of Phonetics of the University of Copenhagen* **13**: 135–69

Halle M 1959 A critical survey of the acoustical investigation of speech sounds. In: *The Sound Pattern of Russian*. Mouton, The Hague

Jespersen O 1897, 1905–06 Zur Geschichte der älteren Phonetik. In: Jespersen O 1933 *Linguistica: Selected Papers in English, French, and German*. Levin & Munksgaard, Copenhagen

Kemp J A 1972 *John Wallis. Grammar of the English Language with an introductory grammatico-physical Treatise on Speech*. Longman, London

Koerner E F K 1994 Towards a history of phonetics. In: Koerner E F K (ed.) *Giulio Panconcelli-Calzia. Geschichtszahlen der Phonetik. Quellenatlas der Phonetik*. Benjamins, Amsterdam (Accompanied by a bibliography of the histor(iograph)y of phonetics) (Revised from 1993 Historiography of phonetics: The state of the art, *Journal of the International Phonetic Association* **23(1)**: 1–12)

Kohler K 1981 Three trends in phonetics: The development of phonetics as a discipline in Germany since the nineteenth century. In: Asher R E, Henderson E J A (eds.) 1981

Laver J 1978 The concept of articulatory settings: A historical survey. *Historiographia Linguistica* **5**: 1–14

Malmberg B 1971 Réflections sur l'histoire de la phonétique. In: *Les Domaines de la Phonétique*. Presses Universitaires de France, Paris

Møller C 1931 Jacob Madsen als Phonetiker. In: Møller C, Skautrup P (eds.) *Jacobi M. Arhusiensis De literis libri duo*. Stiftsbogtrykkeriet, Aarhus

Percival W K 1987 On the extent of phonetic knowledge in the Middle Ages. In: Asbach-Schnitker B, Roggenhofer J (eds.) *Neuere Forschungen zur Wortbildung und Historiographie der Linguistik: Festgabe für Herbert Ernst Brekle zum 50. Geburtstag*. Gunter Narr, Tübingen

Rischel J 1989 Otto Jespersen's contribution to Danish and general phonetics. In: Juul A, Nielsen H F (eds.) *Otto Jespersen: Facets of his Life and Work*. Benjamins, Amsterdam

Robins R H 1979 *A Short History of Linguistics*, 2nd edn. Longman, London (3rd edn., 1990)

Sebeok T A (ed.) 1966 *Portraits of Linguists*, 2 vols. Indiana University Press, Bloomington, Indiana

Shorrocks G 1991 A J Ellis as dialectologist. *Historiographia Linguistica* **18(2–3)**: 321–34

Storm J 1892 *Englische Philologie*, 2nd edn. vol. 1. *Die lebende Sprache. 1 Abteilung: Phonetik und Aussprache*. Reisland, Leipzig

Techmer F 1890 Beitrag zur Geschichte der französischen und englischen Phonetik und Phonographie. *Internationale Zeitschrift für allgemeine Sprachwissenschaft* **5**: 145–295

Ungeheuer G 1962 *Elemente einer akustischen Theorie der Vokalartikulation*. Springer, Berlin

Viëtor W 1898 *Elemente der Phonetik*, 4th edn. O R Reisland, Leipzig

Zwirner E, Zwirner K 1970 Observations on the history of phonetics. In: Zwirner E, Zwirner K *Principles of Phonometrics*. University of Alabama Press, Alabama (Transl. by Bluhme H)

History of Phonetic Transcription

J. A. Kemp

Transcription, in its linguistic sense, has been defined as 'the process of recording the phonological and/or morphological elements of a language in terms of a specific writing system,' as distinct from transliteration which is 'the process of recording the graphic symbols of one writing system in terms of the corresponding graphic symbols of a second writing system.' Transcription, in other words, is a way of writing down a language which does not depend on the prior existence of a writing system, whereas transliteration does.

Systems of transcription have existed from the earliest times. Traditional writing systems of most languages may originally have been transcriptions of speech, but in the course of time have lost much of this connection. Spelling reformers have often sought to restore it. Journalists, missionaries, colonial administrators, teachers, traders, travelers, and scholars have all at one time or another required a precise way of writing down previously unwritten languages for various purposes: to improve communication, to make available translations of the Bible and of noteworthy literary works, to provide education, to record folk literature, and so on. For phoneticians above all, it is essential to have a notation system which allows sounds to be referred to unambiguously.

1. The Segmentation of Speech

Speech in its physical form is a continuum, but transcription requires it to be split up into segments, on the basis of some kind of linguistic analysis. Writing systems of the world fall into different groups according to what types of segments they are based on—words, syllables, or consonants and vowels. Certain features of speech are associated with longer segments than others; for example, stress and intonation, which in many writing systems are not marked, are associated with stretches of speech such as the syllable, word, or sentence.

2. Types of Transcription

A transcription can never capture all the nuances of speech. The amount of detail it attempts to include in its text will vary according to its purpose. A system intended for the specialist linguist investigating a language never previously studied, would often need to allow the recording of as many as possible of the various nuances of sounds, pitch variations, voice quality changes, and so on. Such a transcription may be called 'impressionistic,' and is unlikely to be helpful to anyone other than a specialist.

Proceeding from this initial transcription, the linguist can deduce the way in which the sound system of the language is structured, and can replace the impressionistic transcription with a 'systematic' one, which records in its text only the elements that are crucial for conveying the meanings of the language. This type of transcription may well form the basis for a regular writing system for that language, and is called a 'phonemic' or 'broad' transcription.

For use in teaching the spoken language, however, it may be helpful to transcribe some of the subphonemic (allophonic) sound differences likely to present problems to the learner. This kind of transcription may be called 'allophonic' or 'narrow.' If detailed comparisons are to be made between this language or dialect and another one, showing the more subtle sound distinctions, the transcription may begin to resemble the impressionistic one, but as it is the result of a prior analysis it will still be systematic. For special purposes, such as recording the speech of the deaf, very complex transcription systems may be necessary, to cope with sound variations which rarely occur in the speech of those without such a disability.

3. Notation

Transcription systems need to employ a phonetic notation, in order to refer to a sound unambiguously. The following are some of the principles followed by effective systems of notation:

(a) To avoid ambiguity, each symbol, in its particular environment, should be restricted to one particular sound, or sound class (or, in some cases, group of sounds such as the syllable), and each sound, etc. should be represented by only one symbol. So, for instance, the symbol ⟨j⟩, which has different values in German and English orthography, would need to be confined to one only of those values. Conversely, the sound [s], which in English may be conveyed either by ⟨s⟩ as in 'supersede' or ⟨c⟩ as in 'cede,' must be limited to only one symbol.

(b) The symbols used should ideally be simple, but distinctive in shape, easily legible, easy to write or print, aesthetically pleasing, and familiar to the intended users. If printing types are not readily available, the system will be limited in its accessibility, and expensive to reproduce.

(c) If the transcription is to be pronounceable (not all kinds are required to be) the sound values of the symbols must be made clear, through a description of the way the sounds are formed, or through recorded examples, or 'key words' taken from a language, provided that the accent referred to is specified. Some transcription systems provide pieces of continuous text to illustrate the application to particular languages.

(d) The symbol system should be expandable, particularly if it is intended to be used to cover all languages. As new languages are encountered new varieties of sounds will have to be catered for.

3.1 *Alphabetic Notations: Roman and Nonroman*

Alphabetic notations are those which use one symbol to represent each segment, the most obvious example being the roman alphabet. However, many transcription systems are not based on the roman alphabet, because of the ambiguous values of some of its symbols, or because it has been found preferable to use 'iconic' symbols, intended to convey by their shapes the phonetic nature of the sound concerned, and/or to link related groups of sounds (see Sects. 4.2; 5.6–5.8). One variety of iconic notation has been called 'organic,' because the shapes of its symbols are meant to suggest the organs of speech used to produce them. Shorthand systems characteristically are nonroman and iconic, but not necessarily organic. Iconic systems have a number of drawbacks. Apart from the difficulties of reading and printing them, they cannot be easily expanded to incorporate sounds newly encountered. It is also less easy to adapt them as and when phonetic theory undergoes changes.

3.2 *Analphabetic Systems*

These systems are not based on alphabetic-type segments; the symbols are composed of several elements, resembling chemical formulae, each element representing one ingredient of the sound concerned (see Sect. 5.9).

3.3 *Supplementing the Roman Alphabet*

The number of roman symbols is far too limited to convey the sound distinctions needed. There are various ways of supplementing the basic alphabet (see Abercrombie 1981):

(a) Using 'compound letters' such as ⟨q⟩ and ⟨x⟩ (equivalent to [k(w)] and [ks] respectively in English orthography) to stand for other sounds. Thus ⟨x⟩ may be used to represent the Scottish sound represented by the ⟨ch⟩ in 'loch.'

(b) Inverting, and/or reversing the letters and giving them other values, e.g., [ɔ ə ɟ ɯ ɹ ʌ] are all phonetic symbols formed by inverting ⟨c e f m r v⟩ respectively.

(c) Adding diacritical marks to basic symbols, as in ⟨ä, ã, ạ, ç, ø⟩. These diacritics may be attached to the letter or placed somewhere adjacent to it. They are an economical way of enlarging the repertoire, because one mark can be used to change the value of a number of symbols; for example [˜] represents nasality, and may be added above any vowel symbol. Conversely, being small, they may be inadvertently omitted or obscured, they tend to reduce the legibility of texts, and they can be expensive to reproduce (though less so since the advent of computers).

(d) Adapting symbols borrowed from other alphabets; examples of symbols adapted from Greek by the International Phonetic Alphabet to blend with the roman font are [θ χ ß ɣ] (see Sect. 5.11). Symbols may also be borrowed from another use, such as *(a* (used now in some machine-readable alphabets for [ə]), £, $, %, etc.

(e) Using digraphs to represent simple sounds, as English orthography does in 'thing,' where *th* and *ng* represent the simple sounds [θ], and [ŋ], respectively. The symbols are easily accessible, but problems arise when these sequences are needed to convey actual sound sequences, such as the aspirated stop [th].

(f) Using different typefaces, such as UPPER CASE, *italic*, or **bold** (or even black letter). However, these are less satisfactory for use in handwriting, they may cause confusion with other conventional uses, such as emphasis, and they do not blend well with other fonts, unless specially adapted.

(g) Less commonly, using spatial relationships. With respect to a median line symbols may be placed on the line, above it or below it. Braille makes use of this in certain of its symbols. For normal printing and writing it is not very satisfactory, as it interferes with legibility, and can easily lead to errors.

(h) Inventing entirely new symbols. Unless they are relatively straightforward adaptations of roman letters, as in sections (b) and (c) above, they have rarely survived. One that has, is the IPA symbol for the velar nasal, [ŋ], first(?) used in 1619 by Alexander Gill.

3.4 Nonsegmental Aspects of Speech

For example, in English the position of the stress in the word may need to be indicated. This may be done by a raised mark before the stressed syllable, for instance, 'be 'come, 'beckon,' or by highlighting the syllable in some way. Extra length can be shown by doubling the segmental symbol, as in Italian *freddo* ('cold'), or by adding a diacritical mark, as in [aː]. Pitch is an essential feature of the words of 'tone languages,' such as Chinese, Thai, and Yoruba, and may be marked by accents over the vowel (e.g., [á] = high or rising, [à] = low or falling, [â] = rise-fall), or numerals (e.g., the Mandarin Chinese segmental structure [ma] can have four different tones: [ma^1], [ma^2], [ma^3], [ma^4]). The intonation pattern of English may be indicated by marking the pitch of certain prominent syllables. The first person to try to provide a detailed system of notation for these features in English was Joshua Steele (1775; see *Phonetics: Precursors to Modern Approaches*, Sect. 7.4). Other features also are sometimes treated as nonsegmental, notably nasality and 'secondary articulations' such as palatalization, velarization, labialization, because they frequently overlap segmental boundaries. Traditional transcriptions have allocated these features to segments, adding diacritical marks to the vowel or consonant symbols, but some phonological analyses of speech have associated them with longer stretches by setting up an extra tier for them. J.R. Firth's 'prosodic analysis' allocates 'prosodies' such as nasality and velarity to longer domains, including syllable-part, syllable, word, and sentence. A similar idea lies behind the more recent 'autosegmental' model of phonology.

4. Historical Survey of Transcription Systems

4.1 Roman-based Alphabetic Systems (Pre-nineteenth Century)

The reform of traditional orthographies (notably those of French and English, which presented particular problems for learners) led to innovations in notation. In France Louis Meigret's *La Tretté de la grammere francoȩze* (1550) included a phonetically-based alphabet for French. In England, Sir Thomas Smith (1513–1577) in his *De recta et emendata linguae anglicanae scriptura* (*On the proper and corrected writing of the English language*) (1568) introduced the diacritic [¨] to indicate long vowels: the vowels in 'cheap' and 'hate' are symbolized ⟨ë⟩ and ⟨ä⟩ respectively. Greek ⟨υ⟩ is used for 'French and Scottish u' (i.e., [y]). A reversed ⟨z⟩ replaces the ⟨sh⟩ of 'ship,' and the Irish form of capital ⟨G⟩ represents the first consonant in 'judge.' For the dental fricatives he uses Old English 'thorn' and ⟨ð⟩ (see Fig. 1).

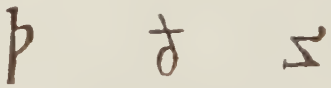
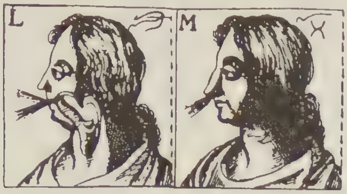


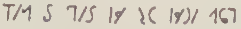
Figure 1. Symbols used for sounds at the ends of the words *pith*, *bathe*, and *dish*. (Sir Thomas Smith 1568)

John Hart (d.1574; see *Phonetics: Precursors to Modern Approaches*, Sect. 4) was familiar with Meigret's system. His book, *An Orthographie* (1569), included special symbols for the consonant sounds

(a) Iconic representations of the sounds [l] and [m]. (John Wilkins 1668)



(b) Syllabic transcription of 'Give us this day our daily bread.' (John Wilkins 1668)



(c) Organic alphabet. Transcription of 'I remember, I remember, the roses red and white.' (Henry Sweet 1906)

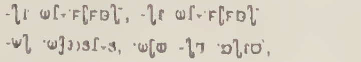


Figure 2. Three nonroman transcriptions.

[θ ð ʃ ʧ dʒ], beautifully integrated into the text. He was a keen observer of speech and records the occurrence of syllabic consonants such as the final ⟨l⟩ in 'fable,' which he transcribes as ⟨l̩⟩.

William Bullokar (ca.1531–1609) in his *Book at large for the amendment of orthographie for English speech* (1580) provided 40 symbols for transcribing English. By using a black letter fount he opened up extra possibilities of rarely used printing sorts. He illustrated his phonetic alphabet by using it in a number of literary texts, including *Aesop's Fables*.

In *Logonomia Anglica* (1st edn. 1619) Alexander Gill (1564–1635) (see *Phonetics: Precursors to Modern Approaches*, Sect. 6) introduced a number of extra letters. Like Smith, he used ⟨ð⟩ for the first sound in 'this,' and in his second edition (1621) introduced ⟨ŋ⟩ for the velar nasal. He transcribes the word 'high' as ⟨hjħ⟩, using ⟨j⟩ for the vowel and ⟨ħ⟩ for the final consonant. Charles Butler (1560–1647) in his *English Grammar* (1633) uses a horizontal stroke through certain letters to replace the letter ⟨h⟩ in digraphs so that ⟨sh, ph, ch, wh, gh⟩ are represented by ⟨s, p, c, w, h⟩ respectively with a stroke through them. He also introduced the symbol ɟ to represent the ⟨th⟩ in 'thin.'

John Wilkins (1614–72; see *Phonetics: Precursors to Modern Approaches*, Sect. 6.4) devised three separate systems of notation in his *Essay Towards a Real Character* (1668) (see Fig. 2). One of these is roman-based, and uses digraphs to supply extra consonant symbols. The letter ⟨h⟩ includes both fricatives, as in ⟨ch, gh, th, dh, sh, zh⟩ (for [x ɣ θ ð ʃ ʒ]), and voiceless forms of nasals and liquids so that voiced ⟨ng, n, m, l, r⟩ are paralleled by voiceless ⟨ngh, nh, mh, lh, rh⟩. For some of the vowels Wilkins employed rather poorly designed Greek symbols, which contradicted one of his stated principles for choosing symbols:

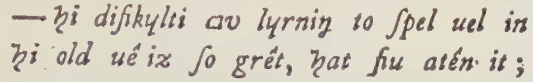


Figure 3. Excerpt illustrating the extended alphabet. (Benjamin Franklin 1779)

1. They should be the most simple and facil, and yet elegant and comely as to the shape of them.
2. They must be sufficiently distinguished from one another.
3. There should be some kind of suitableness, or correspondency of the figure to the nature and kind of the letters which they express.

The third condition refers to a nonarbitrary, or iconic type of notation.

In the eighteenth century social reformers aiming to reduce class barriers tried to establish a standard form of pronunciation, and, to facilitate the spread of literacy, reformed spelling systems were suggested. Thomas Sheridan (1719–88; see *Phonetics: Precursors to Modern Approaches*, Sect. 7.3) was one of the first to publish a pronouncing dictionary of English (1780), which gave a respelling to every word, and a similar dictionary was published in 1791 by John Walker (1732–1807; see *Phonetics: Precursors to Modern Approaches*, Sect. 7.3).

In America spelling reform led the famous American statesman, scientist, and philosopher, Benjamin Franklin (1706–90) to put forward a new alphabet in 1768. It was limited to 26 symbols, of which 6 were newly invented to take the place of the 'ambiguous' letters ⟨c j q w x y⟩. Some of these new symbols (for [ʃ θ ð]) were rather too similar in form to each other to be satisfactory, but the printed font was attractively designed; it was published as part of Franklin's collected works (1779) (see Fig. 3).

William Thornton (1759–1828), a Scottish American of many parts, who spent most of his life in Washington, also attempted to reform English spelling, and in the longer term to make possible the transcription of unwritten languages. His treatise, entitled *Cadmus, or a Treatise on the Elements of Written Language* (1793), won the Magellanic gold medal of the American Philosophical Society. The notation was roman-based and introduced some well-designed additional letters, including □ for the vowel in *saw*, ⟨ɯ⟩ to replace ⟨w⟩, ⟨ɾ⟩ for the first consonant in 'ship,' and a circle with a dot in the centre (a Gothic symbol) for ⟨wh⟩ in 'when.' He aimed to economize by using inverted basic symbols where possible, e.g., ⟨m,ɯ⟩, ⟨n, u⟩, ⟨ȷ, ɾ⟩. Some years later Thornton used his alphabet to transcribe 288 words in the Miami Indian language. Among admirers of his system were Thomas Jefferson, Alexander von Humboldt, and Count Volney (see Sect. 5.1).

The increasing involvement of Europeans with the languages of Asia, Africa, and of America, whether as traders, missionaries, travelers, or colonial administrators emphasized the need for a standard, universal alphabet. One of the first to try to provide a transliteration for Asian languages was the brilliant English oriental scholar and linguist Sir William Jones (1746–1794). He was a highly skilled phonetician, and during his time as a high court judge in India (1783–94) saw the need for a consistent way of transcribing oriental languages. His system is presented in his *Dissertation on the Orthography of Asiatick words in Roman letters* (1788). He thought it unnecessary to give any account of the speech organs, but gives a short description of the sounds. An ideal solution, he believed, would be to have 'a natural character for all articulate sounds . . . by delineating the several organs of speech in the act of articulation' (i.e., an 'organic' alphabet), but for oriental languages he preferred a transliteration. This was partly because of the difficulty of conveying the precise nature of sounds to the non-specialist, but also because he wished to preserve the orthographical structure, so that the 'grammatical analogy' would not be lost, and one would not be in danger of representing 'a provincial and inelegant pronunciation.' The system was not intended as a universal alphabet; his notation is confined to the letters of the roman alphabet, supplemented by digraphs and a few diacritics. He chose the vowel symbols on the basis of the values they have in the Italian language, rather than those of English, unlike some other schemes used in India at the time. His alphabet had an influence on nearly all subsequent ideas for the transliteration of oriental languages, at least for the following century. The romanization of these languages became a major concern of missionaries, administrators, educationists, and travelers, though some scholars, and literate members of the communities concerned, were less enthusiastic, believing that something culturally vital would be lost if the native scripts were changed into a different form.

4.2 Iconic Alphabets (Pre-nineteenth Century)

John Wilkins also put forward two iconic systems of notation. The more elaborate of them, which was not intended to be used to transcribe connected speech, consisted of small diagrams of the head and neck, cut away to show the articulatory formation of each sound. Next to each diagram was a simplified symbol relating to the way the sound was formed (see Fig. 2(a)).

The second notation assigned each consonant a symbol, which took various forms: straight line, T shape, L shape, or various forms of curve. To this basic shape he added a small circle or hook, at the top, middle, or base, to represent one of six vowels. Thus the composite symbol represented a syllable, either vowel + consonant or consonant + vowel. Each category, such as oral stop consonants, fricatives, nasals, had a characteristic shape, as did voiceless and voiced sounds at the same place of articulation. The system was ingenious, but the symbols could easily be confused, and it is unlikely that anyone other than Wilkins himself actually used it (see Fig. 2(b)).

Wilkins' contemporary Francis Lodwick (1619–94) published a similar system under the title *An Essay towards an Universal Alphabet* in 1686. He states in his text the important principle that 'no one character should have more than one sound, nor any one sound be expressed by more than one character.' The notation was a syllabary, using shapes designed to show similarities between the sounds symbolized, which are set out in a table with six places of articulation: bilabial, dental, palatal, velar, labiodental, and alveolar. The top symbol in each column is the voiced stop, and the lower ones are formed by progressive modifications of it. As with Wilkins's system the vowels are added to the consonant symbols as diacritics.

Another iconic alphabet is to be found in chapter 5 of the *Traité de la formation méchanique des langues*, published in 1765 by the French scholar and magistrate, Charles de Brosses (1709–77). It was intended for scholars researching into languages, rather than for everyday use. He called it 'organic and universal.' It is based on a somewhat idiosyncratic analysis of speech production, which assumed that the vowels were sounded at different points on a *corde* or string, equivalent to the vocal tract tube. His understanding of speech production was defective in other ways also; for example, he classes ⟨s⟩ as a nasal consonant. He first suggested a notation which used symbols picturing the outline of the different vocal organs—lips, teeth, palate, nose, etc., but simplified this subsequently, using straight lines at different angles, and curves. The vowel symbols were attached to the consonants to give a syllabic sign, and the notation includes composite symbols to represent consonant clusters.

5. Nineteenth-century Transcription Systems

5.1 Volney and the Volney Prize

The French orientalist, statesman, and reformer Count Constantin François Volney (1757–1820) had been concerned for many years about the difficulties experienced by Europeans in learning oriental languages, and the poor standard of the teaching of these languages. His book *Simplification des langues orientales* (1795) put forward a system for transliterating Arabic, Persian, and Turkish into roman script, supplemented by a few Greek letters and some newly invented symbols. During a visit to America in 1795–1798 he stayed with William Thornton (see Sect. 4.1), and while there became acquainted with Sir William Jones's alphabet. He conceived the idea of a universal alphabet, not for scholarly purposes, but to act as a practical tool for travelers, traders, etc. His 1795 system was used with modifications for geographical names in the map of Egypt compiled in 1803 by the French Government, but his later *L'Alphabet eur-*

Lettres	simples,	variées,	fortes,	mouillées,	aspirées.
Gutturales:	k, q, g, h, ᶜ,	ğ, h̤, ḫ,	k̗, ĝ, h̗, h̗̗,	k̇, ġ,	ḱ, ǵ.
Palatales:	c̄, ḡ, j̄, s̄,	ć, s̬̄,		ĉ, ĵ, ŝ, ŝ̬,	c̄́, ḡ́.
Sifflantes:	s, z,	s̱, ṣ, ẕ, ẓ, z̤,	s̗, z̗, z̗̗,	ṡ, ẓ̇, ż̗	ź̗, ẕ́.
Linguales:	t, d,	ṯ, ṭ, t̤, ḏ, ḍ̈,	t̗, d̗, d̗̈[sic],	ṫ, ḋ	t́, ṭ́, d́, ḍ́.
Labiales:	p, b, f,	p̄, f̱,		ḃ, ṗ,	ṕ, b́.
Nasales:	n, m,	ṇ, n̬, ň, ṉ, m̱,		ṅ, ṁ,	
Mêlées:	j̈, r, l, v, x,	r̈, ř, ṛ, l̆, w,	r̗, ł,	ṙ, l̇, v̇,	ṛ́.

Figure 4. Table of consonant symbols. (Schleiermacher's TABLEAU DES CONSONNES DE L'ALPHABET HARMONIQUE 1835)

opéen appliqué aux langues asiatiques (Paris 1819) provided a fuller system of sixty symbols, mostly roman, replacing some of previous, newly invented, symbols with letters modified by diacritics. However, he realized that further research was needed, and his final gesture was to leave 24,000 francs in his will, for a prize to be awarded by the Institut de France to anyone who could devise a suitable 'harmonic alphabet' (to bring harmony out the existing confusion of practices) in roman script.

The prize for the first year (1822) was to be for an essay setting out the necessary conditions for such an alphabet. The prizewinners were both German librarians: Josef Scherer (1776–1829) argued that what was necessary was a transcription of pronunciation rather than a transliteration, whereas A. A. E. Schleiermacher (1787–1858), the co-winner, favored a transliteration, for very much the same reasons as those given by Sir William Jones (see Sect. 4.1). Scherer and Schleiermacher submitted detailed transcription systems for the 1823 prize, which was won by Scherer; Schleiermacher's essay was submitted later in a revised form, and was published in 1835. He continued to work on his system, and his completed scheme was eventually published after his death (1864): *Das harmonische oder allgemeine Alphabet zur Transcription fremder Schriftsysteme in lateinische Schrift*. Together with his new alphabet it contained examples of the nonroman scripts of ten languages. In all 275 new characters had to be cast. His notation excluded digraphs and letters from other alphabets, which he felt would be typographically unsuitable, so his main resource was diacritics, both above and below the basic symbols. Some of these were used systematically (e.g., to indicate nasality, aspiration, or palatalization) but he admitted that problems of legibility and combinability had often made total consistency impossible. The alphabet was never adopted for wider use (see Fig. 4).

Further essays on transcription were submitted for the Volney Prize over the next 20 years, but none of them was deemed by the commission set up to administer the prize to be the 'final answer' to the problem.

5.2 Shorthand and Spelling Reform

In the nineteenth century the most prominent spelling reformer was Sir Isaac Pitman (1813–97). He was himself of comparatively humble origins, and determined from his early years to further social reform and improve the educational system by developing new alphabets to make spelling easier. He first of all developed a system of shorthand (now world famous), which he called *Phonography* (published in 1837), exploring the ways in which notation systems can be made to act efficiently in conveying language. Unlike earlier systems, it was based not on English spelling, but on the English sound system.

By 1842 Pitman had devised several possible phonetic alphabets, but they still contained elements of his shorthand. In the following year he came down firmly in favor of using the letters of the roman alphabet as a basis, and the same year saw the beginning of his connection and cooperation with Alexander J. Ellis (1814–90; see *Phonetics: Precursors to Modern Approaches*, Sect. 10.1). Ellis was from a very different background, with a first in mathematics from Cambridge, and a private fortune. He had struck up an interest in phonetic notation partly through his attempts to write down dialects he met with in his travels abroad, but it was only after meeting with Pitman's work that he began to study phonetics seriously. Over the next few years Pitman's untiring enthusiasm in publicising the new ideas, and Ellis's knowledge of languages and assiduous research into the background of phonetics and notation systems, resulted in the English Phonotypic Alphabet of 1847 (see Kelly 1981). Many of the symbols used later formed the basis of the alphabet of the International Phonetic Association. The proposed reform of English spelling never materialized, but Ellis's subsequent work on phonetic notation (see Sect. 5.5) undoubtedly owed much to these early years of collaboration with Pitman.

In America also proposals for spelling reform continued to appear. In 1858 the President of the Phonetic Society of Great Britain, Sir Walter Trevelyan (1797–1879), proposed a prize for an essay on a reform in the spelling of the English language, which should contain an analysis of sounds and an alphabetic notation containing as few new types as possible. The prize-winning essay, entitled *Analytic Orthography* (1860), was by Samuel Haldeman (1812–80), Professor of Zoology and Natural History at the University of Pennsylvania, and later Professor of Comparative Philology at the same university. He had a strong linguistic background, notably in Native American languages, and was a good phonetic observer, fully familiar with the work of Sir William Jones, and his contemporaries Lepsius, Ellis, Pitman, Melville Bell, and Max Müller. His notation was based on the roman alphabet, and the letters used were restricted to the values they had in Latin. He used some diacritics and a few new letters, including some 'broken' letters—that is roman forms with part of their strokes missing—not a satisfactory device. He also attempted to symbolize durational differences by introducing characters of different widths. However, his system had no better success than others of the time.

5.3 Languages of America and Africa

In the early nineteenth century most of the languages of Africa and the indigenous languages of America had no writing systems. Pierre Du Ponceau (1760–1844), a French emigré to the United States, won the Volney Prize in 1838 with his *Mémoire sur le système grammatical des langues de quelques nations indiennes de l'Amérique du Nord*, and had shown in an earlier article (*English Phonology*, 1817) a thorough understanding of the principles of a universal alphabet, though he never produced one himself. Under his influence John Pickering (1777–1846), like Du Ponceau a lawyer by training, was led to publish his *Essay on a uniform orthography for the Indian languages of North America* (1818). Like Sir William Jones, whose work he admired, he used a roman alphabet supplemented by digraphs, and some diacritics—preferring small superscript letters or subscript numerals to dots or hooks, which he felt might accidentally be omitted. It was designed specifically for Native American languages, not as a universal alphabet.

Many of the missionary societies were concerned at this time to establish a standard transcription system. The Church Missionary Society (CMS) produced a pamphlet in 1848 entitled *Rules for reducing unwritten languages to alphabetical writing in roman characters: With reference especially to the languages spoken in Africa*. The rules allowed some flexibility in deciding how detailed the transcription should be, according to its intended use. The notation suggested was roman-based, with a few diacritics and some digraphs. Lewis Grout (1815–1905) produced a roman-based system for Zulu in 1853, on behalf of the American Mission in Port Natal, using the symbols ⟨c, q, x⟩ for the clicks.

5.4 Carl Richard Lepsius (1810–84)

In 1852 the CMS invited the distinguished German Egyptologist Lepsius to adapt an alphabet which he had devised earlier, to suit the needs of the Society. Lepsius had been interested in writing systems for many years. In 1853 he won the agreement of the Royal Academy of Berlin to fund the cutting and casting of types for a new alphabet to be used as a basis for recording languages with no writing system.

In the following year an Alphabetical Conference was convened in London, on the initiative of the Prussian ambassador in London, Carl Bunsen (1791–1860), who, as a scholar himself with an interest in philology, wished to explore the possibility of an agreed system for representing all languages in writing. It was attended by representatives from the CMS, the Baptist Missionary Society, the Wesleyan Missionary Society, and the Asiatic and Ethnological Societies, and a number of distinguished scholars, including Lepsius and Friedrich Max Müller (1823–1900). In spite of their well-known involvement in the transcription problem, neither Isaac Pitman nor A. J. Ellis were among those included. Four resolutions were passed: (a) the new alphabet must have a physiological basis; (b) it must be limited to the 'typical' sounds employed in human speech; (c) the notation must be rational and consistent and suited to reading and printing and also it should be roman based, supplemented by various additions; and (d) the resulting alphabet must form a standard 'to which any other alphabet is to be referred and from which the distance of each is to be measured.'

Lepsius and Max Müller both submitted alphabets for consideration; Müller's *Missionary Alphabet*, which used italic mixed with roman types, was not favored, and Lepsius's extensive use of diacritics had obvious disadvantages for the legibility and availability of types. The conference put off a decision, but later in 1854 the CMS gave its full support to Lepsius's alphabet. A German version of it appeared in 1854 (*Das allgemeine linguistische Alphabet*), followed in 1855 by the first English edition, entitled *Standard Alphabet for reducing unwritten languages and foreign graphic systems to a uniform orthography in European letters* (see Fig. 5).

The alphabet had some success in the first few years, but Lepsius was pressed by the CMS to produce a new enlarged edition, which appeared in English in 1863 (printed in Germany, like the first edition, because the types were only available there). The most obvious difference from the first edition was that the collection of alphabets, illustrating the application of the alphabet to different languages, had been expanded from 19 pages and 54 languages to 222 pages and 117 languages (see Lepsius 1981).

There was as yet no phoneme theory, but Lepsius was well aware that no alphabet could or should try to convey all the subtle nuances of speech. His prac-

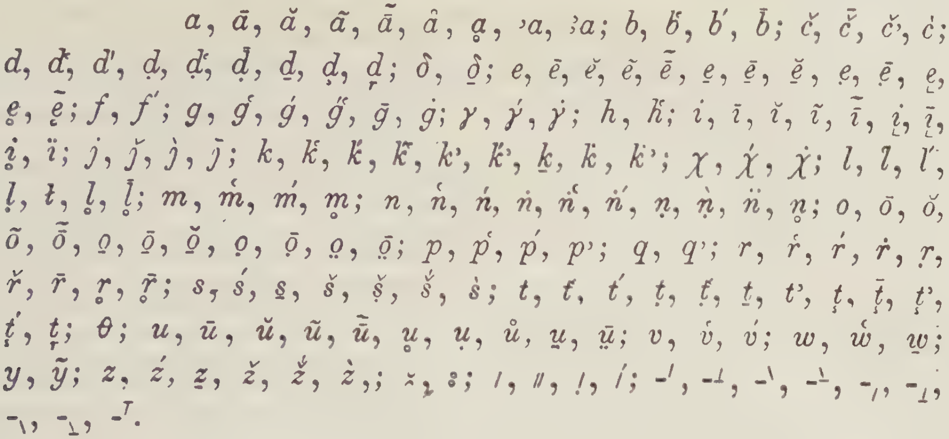


Figure 5. Symbols from the 'Standard Alphabet'; note the many diacritics. (Lepsius 1855)

tical aim was to make an intelligible and usable system available to nonspecialists—hence the expansion of the collection of alphabets, and the avoidance of a technical description of the physiology of speech. However, he relied almost entirely on the use of diacritics to supplement the basic roman symbols. They were used in a consistent way for the most part, and Lepsius foresaw situations in which it would not be necessary to use all the distinctions provided for, namely where in modern terms a 'broad' transcription would be sufficient. Nevertheless the profusion of diacritics meant that the printing types were less accessible, and the symbols were less legible and more subject to errors in reproduction. Ellis calculated that on the basis of 31 diacritical marks (17 superscripts and 14 subscripts) Lepsius's alphabet had at least 286 characters, of which at least 200 would have to be cut for every fount used.

The alphabet attained a limited success in Africa; the distinguished Africanist Carl Meinhof (1857–1944) and his missionary friend Karl Endemann (1836–1919) gave it their support by using it, with some modifications, in their works on African languages (see Heepe 1983), and the missionary P. Wilhelm Schmidt (1845–1921) adopted it as a basis for his 'Anthropos Alphabet' (see Sect. 6.1). However, in spite of Lepsius's high international reputation, the support of the Berlin Academy, and the resources of the CMS the alphabet failed to find an established place.

5.5 A. J. Ellis's Later Alphabets

Ellis's *Universal writing and printing with ordinary letters* (1856) contained his 'digraphic' and 'latinic' alphabets, with examples, hints on practical use, and comparisons with the systems of Lepsius and Max Müller, together with suggestions for a future 'panethnic' alphabet. The digraphic alphabet, as its name suggests, supplemented the roman alphabet with digraphs or trigraphs, such as ⟨kh⟩ for [x], ⟨ng⟩ for [ŋ], and ⟨ngj⟩ for [ɲ] with the idea of making its notation accessible to as wide a group of people as possible. It was intended for use in any language, and Ellis supplied an abbreviated form of it for use where detailed precision of description was not necessary. The latinic alphabet was intended for those wishing 'to avoid the cumbersomeness of the digraphic alphabet,' which it did by employing small capitals and turned letters; so for example [x] is rendered by ⟨ᴋ⟩, and [ŋ] by ⟨ɴ⟩.

Probably his best-known alphabet is palaeotype (so-called because it used the 'old types,' without diacritics or nonroman symbols, and with relatively few turned letters). It was for scientific, not popular, use, and he employed it in his monumental work *On Early English Pronunciation* (1869–89) (EEP). There were about 250 separate symbols, the greater number digraphs or trigraphs, but with some italics, small capitals, and (very few) turned letters. Certain letters were used as diacritical signs, for instance ⟨j⟩ to indicate palatality, as in ⟨lj⟩ for [ʎ]. There were also nonalphabetic signs for features like ingressive airstreams, tones, and stress. Ellis provided a reduced form known as 'approximative palaeotype,' which contained about 46 separate symbols. The full alphabet was, he believed, 'in all probability the most complete scheme which has yet been published,' but he foresaw the need to supplement it to accommodate sounds from languages not yet phonetically studied.

In the third volume of EEP (1871) Ellis published the 'glossic' alphabet, a simplified form of transcription for English, based on symbols used in normal English orthography. He intended it as a new system of spelling, to be used concurrently with the existing English orthography. In answer to objections that it would be too sweeping a change, Ellis produced a revised form in 1880 called 'dimidiun,' but this received even less support.

None of these alphabets was destined to have any lasting success, but in the process of devising them Ellis laid a foundation for the development of phonetics as a discipline in Britain, and more particularly for the study and recording of English dialects.

5.6 Germany: Physiology and New Alphabets

In Germany several schemes for a new alphabet were proposed by scholars who approached phonetics from a physiological rather than a linguistic angle. Karl Rapp (1803–83; see *Phonetics: Precursors to Modern Approaches*, Sect. 9.1) in *Versuch einer Physiologie der Sprache* (1836) used a roman alphabet, supplemented by some letters taken from the Old English and Greek alphabets, and a few diacritics. Ellis, writing in the 1840s, frequently paid tribute to Rapp's work. Ernst Brücke (1819–92; see *Phonetics: Precursors to Modern Approaches*, Sect. 9.2) in his *Grundzüge der Physiologie* (1856), also put forward a roman-based alphabet, supplemented by some Greek letters and by superscript numerals used as diacritics. For example, ⟨t^1⟩ represented alveolar [t], ⟨t^2⟩ retroflex [ʈ], and so on. Later (*Über eine neue Methode der phonetischen Transscription*, 1863) he developed an iconic nonroman alphabet, in which the consonant symbols are based on articulations, but the vowel symbols on acoustic resonances. The consonants occupy one or more of three vertically aligned areas, and are made up of two basic parts, one showing place of articulation and the other manner of articulation. A further part indicates states of the glottis other than 'vibrating'—open, narrowed, closed, creaky, and what he called 'hard resonance' and 'soft resonance.' The vowels occupy only the middle of the three areas, so that they stand out clearly. Diacritics are provided to indicate accent, duration, and types of juncture.

Carl Merkel (1812–76) also devised a nonroman alphabet (*Anatomie und Physiologie des menschlichen Stimm- und Sprachorgans*, 1857; rev. edn. 1866), but, like Brücke's, it is extremely difficult to read, and neither system attained any success. Both Brücke and Merkel were familiar with only a small range of languages, and were concerned primarily to show the total capacities of the human vocal organs in the production of sounds.

Moritz Thausing (1838–84; see *Phonetics: Precursors to Modern Approaches*, Sect. 9.4) in *Das natürliche Lautsystem der menschlichen Sprache* (1863), based his system on a *Naturlaut* 'natural sound' represented by the vowel ⟨a⟩, and 21 other sounds, which diverged from ⟨a⟩ in three different directions (7 on each path), like a three-sided pyramid. His notation uses a musical staff of four lines and three spaces, thus accommodating the 7 grades of sounds as notes on the staff. Each of the three sets of seven has a special note shape to distinguish it. Intermediate sounds are shown by modifiers. Thausing believed this was preferable to Brücke's scheme in that the symbols were not iconic, and so could be used for new sounds whose formation was not fully understood.

Félix Du Bois Reymond (1782–1865; see *Phonetics: Precursors to Modern Approaches*, Sect. 9.5) was stimulated by the schemes put forward by Brücke and Lepsius to complete a scheme of his own (*Kadmus*, 1862), which he had sketched out earlier. It was roman-based, but, unusually, attempts to combine this with an iconic approach. So, for instance, all the voiceless consonants have symbols which extend below the 'middle area' (*mittlere Bahn*), unlike the voiced ones: ⟨p⟩ and ⟨b⟩ already conform to this principle, and to carry it on he proposed, for example, that the symbol ⟨q⟩ should replace ⟨t⟩ as the voiceless equivalent of ⟨d⟩. Like Brücke he confined the vowel symbols to the 'middle area.' In spite of a good phonetic basis outlined in his book the scheme failed to establish itself.

5.7 Bell's Visible Speech

Alexander Melville Bell (1819–1905; see *Phonetics: Precursors to Modern Approaches*, Sect. 10.2) was the son of an elocution teacher, and in due course became his father's principal assistant. Between the years 1843 and 1870 he lectured in the Universities of Edinburgh and London, after which he emigrated to Canada and continued his teaching there. In 1864 he gave public demonstrations of his new scheme for recording speech in writing, and in 1867 it was published under the title *Visible Speech, the Science of Universal Alphabetics*. It was not (at least avowedly) intended to be a new spelling system, but rather to assist children in learning to read, and to provide 'a sound bridge from language to language.' He was unsuccessful in attempts to persuade the British government to give him funds to support it, but continued to use it for his own purpose in teaching, and claimed that it was 'perfect for all its purposes.'

The symbols he used were iconic, intended to signify the vocal organs involved in the production of the sound concerned. For instance the open vocal cords are shown by ⟨O⟩, which represents [h]. The consonant symbols are based on a sagittal diagram of the head facing right. The shape ⟨c⟩ represents a continuant (shown by the fact that there is a gap to the right) with a constriction at the back (i.e., [x]), while ⟨ɔ⟩ represents a constriction at the front of the vocal tract, namely [ɸ]. The same symbol with the gap facing upwards represents dental [θ], and with the gap facing downwards, palatal [ç]. The remaining consonant symbols have similar iconic relationships, with modifiers to show complete closure (a bar across the gap), nasality (a different bar), voicing, etc. The vowel symbols are based on a vertical line, with hooks at the top (close vowels), bottom (open vowels), or both (mid vowels), facing left for back vowels, right for front vowels, and in both directions for the so-called 'mixed' or central vowels. Rounding is shown by a horizontal bar through the middle.

Ellis, writing just before the full publication of *Visible Speech*, admitted that his palaeotype was 'far less complete' than Bell's scheme. 'However, that alphabet,' he said, 'requires new types, which is always an inconvenience, though I believe that an entirely new system of letters, such as that of Mr. Bell, is indispensable for a complete solution of the problem.' He pointed out also that many potential users 'are ill-qualified, without special training, to use a very refined instrument.' Iconic notations are certainly subject to the criticism that they may not be able to accommodate new sounds or new descriptive frameworks, and can never convey the exact nature of the sound symbolized. Bell's symbols were much better in design than most alphabets of this kind, but he faced the immense task of persuading people to adopt a system that looked very different from what they were used to. The alphabet failed to find supporters outside the circle of his pupils.

5.8 Sweet's Romic and Organic Alphabets

Henry Sweet (1845–1912; see *Phonetics: Precursors to Modern Approaches*, Sect. 10.3), perhaps the greatest of nineteenth century phoneticians, studied under Bell, and his *Handbook of Phonetics* (1877) was intended to be an exposition and development of Bell's work, but in this book he used a roman-based notation (influenced by Ellis's Palaeotype), which he called 'romic,' distinguishing two varieties of it. 'Broad romic' was his 'practical' notation, intended to record only 'fundamental distinctions,' corresponding to distinctions of meaning (i.e., phonemes, in modern terms), and was confined to symbols with their original roman values supplemented by digraphs and turned letters. 'Narrow romic' was to be a 'scientific' notation, and provided extra symbols, notably for the vowels, where he used italics, diacritic ⟨h⟩, and further turned letters.

However, in 1880 he took over Bell's notation, which he regarded as 'an improvement on any possible modification of the roman alphabet' for scientific purposes. He modified it and added some symbols, to form an 'organic alphabet,' which he used in his *Primer of Phonetics* (1890) and in some other works (see Fig. 2). At this stage he felt that, even for more practical purposes, the necessity to supplement the roman alphabet with other devices (in particular, diacritics and new letters, which he strongly opposed) made it cumbersome and inefficient. Towards the end of his life, however, he emphasized that uniformity in notation was not necessarily a desirable thing 'while the foundations of phonetics are still under discussion,' and accepted that the unfamiliarity of organic types might be too formidable an obstacle to overcome. He continued to use his romic alphabet as an alternative to the organic one, and broad romic formed the basis for the new alphabet of the International Phonetic Association (see Sect. 5.11). Sweet's organic alphabet did not survive; nor indeed did the idea of iconic alphabets, even though Daniel Jones (1881–1967) and Paul Passy (1859–1940; see *Phonetics: Precursors to Modern Approaches*, Sect. 12) thought it worthwhile to propose another such scheme in *Le Maître Phonétique* (1907).

5.9 Analphabetic Schemes

'Analphabetic' notations use symbols which analyze the segment into subcomponents, rather like chemical formulas. One early example of such a scheme was proposed by the Dutch writer Lambert ten Kate (1674–1731) in 1723, and another by Charles Darwin's grandfather, Erasmus Darwin (1731–1802), published in 1803. Thomas Wright Hill (1763–1851), a schoolmaster in Birmingham, who had a keen ear, though his knowledge of sounds was self taught, devised a notation in which each place of articulation was allotted a number. The interaction of active and passive articulators was expressed in terms of numerator (passive) and denominator (active); for example, a bilabial articulation is 1 (upper lip) over 1 (lower lip), a labiodental 2 (upper teeth) over 1, a dental 2 over 3 (tongue tip), and so on. The degree of stricture and state of the glottis was shown by the shape of the line between the numbers, and vowels were indicated by the use of double lines instead of a single one.

However, it is easier for the printer if symbols are in a horizontal sequence. In 1889 Otto Jespersen (1860–1943; see *Phonetics: Precursors to Modern Approaches*, Sect. 12) included his analphabetic (later called antalphabetic) alphabet in *The Articulations of Speech Sounds*. It uses a combination of roman letters, Greek letters, numerals, italics, heavy type, and subscript and superscript letters. The Greek letters represent the active articulators involved—lower lip (α), tongue tip (β), tongue body (γ), velum and uvula (δ), vocal cords (ε), and respiratory organs (ζ). The numerals following the Greek letter show the relative stricture taken up by the articulators and the roman letters refer to the passive articulators. For example, the combination $\beta 1^{\mathrm{fe}}\delta 0\varepsilon 3$ would represent one kind of [s] (β = tongue tip, 1 = close stricture, fe = in the area of alveolar ridge/hard palate, $\delta 0$ = velic closure, $\varepsilon 3$ = open vocal cords). It was not intended for use in a continuous transcription (though Jespersen shows how this is possible in a matrix form), but serves as a descriptive label for the segment concerned; cf. modern feature notations.

Friedrich Techmer (1843–91; see *Phonetics: Precursors to Modern Approaches*, Sect. 11.4) had proposed an analphabetic scheme in his *Phonetik* (1880). It employed five horizontal lines, which, together with the spaces in between them, showed the major places of articulation. Musical-type notes were then inserted to show the manners of articulation. It was designed essentially as a scientific notation for his own use, and never achieved widespread adoption. (His roman-based alternative, published in the *Internationale Zeitschrift fur allgemeine Sprachwissenschaft* (**1**: 1884 and **4**: 1888), was a highly detailed and systematic scheme, making use of a basic italic typeface, both upper and lower case, with various diacritics either directly beneath or to the right of the main symbol. Johan Storm (1836–1920; see Sect. 5.10) judged it to be the best of the German systems of notation, and it was the basis for Setälä's 1901 transcription for Finno Ugric languages.)

Kenneth Pike (b.1912), in his classic book *Phonetics* (1943), outlined an even more detailed analphabetic notation, called 'functional analphabetic symbolism.' It is composed of roman and italic letters in upper and lower case, and is intended to illustrate the complexity of sound formation, and to expose the many assumptions which lie behind the customary short labels used to refer to sounds. The segment [t] is represented by the notation *M*aIlDe*C*VveIcAP*paa*t*d*tl*t*n*r*an*s*fs*S*i*F*Ss; the italic symbols give the broad headings of the mechanisms involved and the roman letters give subclassifications. Even this degree of complexity, Pike says, is 'suggestive but by no means exhaustive.'

5.10 Dialect Alphabets

Various special alphabets have been created for the transcription of particular dialects (see further in Heepe 1983). J. A. Lundell (1851–1940) was commissioned while still a student at Uppsala to produce an alphabet for Swedish. The resulting *Swedish Dialect Alphabet* was first published in 1879, and has been widely used since then, not only for Swedish. The basic fount is italic, which Lundell thought most suitable for cursive writing as well as printing, and he supplements the letters of the roman alphabet almost entirely by employing new letter shapes, mostly formed by adding loops or hooks to the basic symbols. They retain some iconic character through a consistent use of a particular hook, etc. for one place of articulation. Lundell rejected the use of different founts and of capital letters to make distinctions, and also avoided unattached diacritics, except those for suprasegmental features. Sweet was critical of Lundell's scheme, mainly on the grounds of the complex letter shapes and the consequent expense of casting the many new types required, but Storm, in correspondence with Sweet, expressed a much higher opinion of it, particularly the systematic character of the letter shapes used for consonants. Some of the vowel symbols are easily confused, and would require extreme care in handwritten texts.

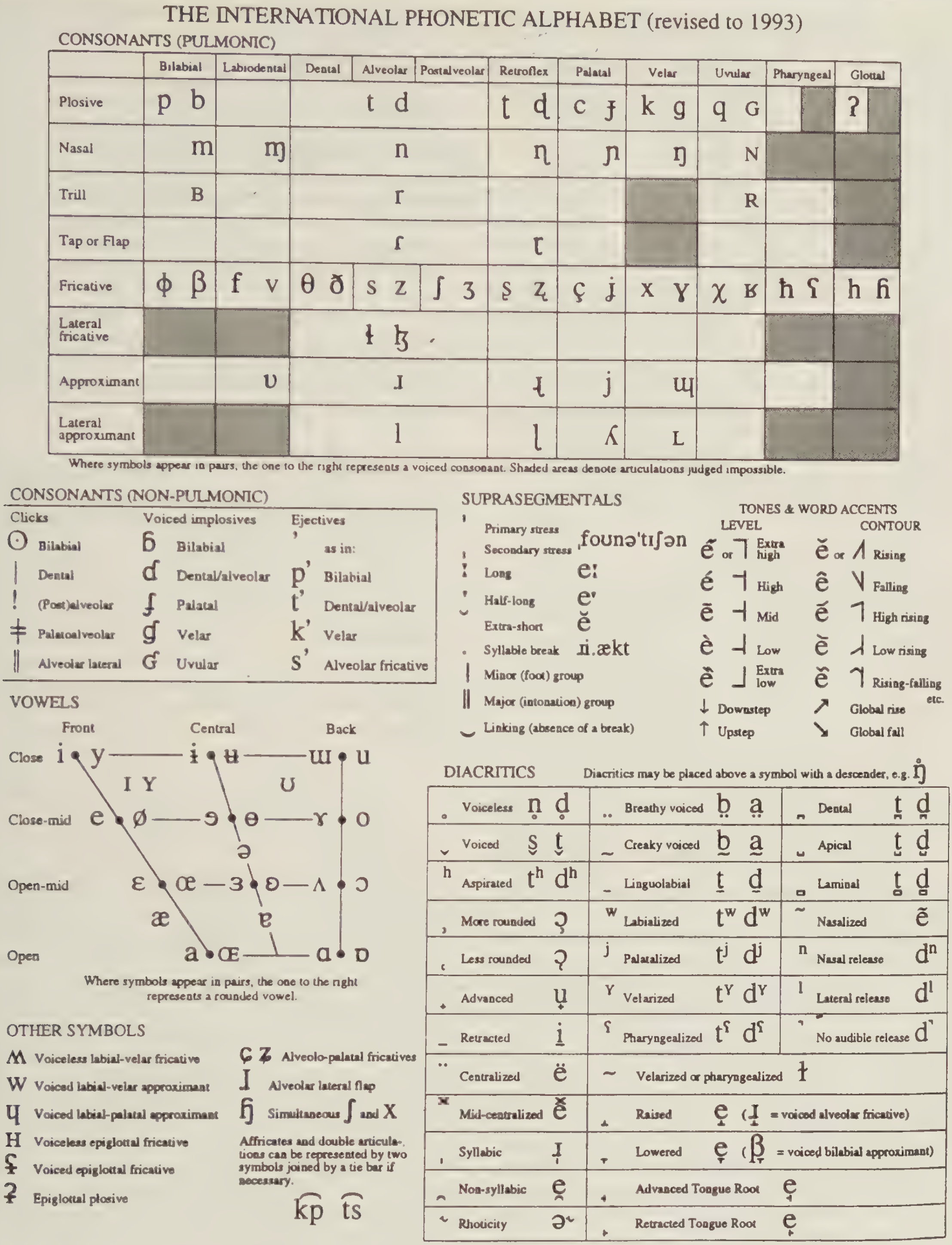
Johan Storm was professor of Romance and English philology at the University of Kristiania (now Oslo), Norway from 1873 to 1912. He was a highly gifted phonetician, who exercised a strong influence on his contemporaries Henry Sweet and Eduard Sievers. The detailed phonetic alphabet for Norwegian which he established (now called 'Norvegia') has been expanded to some 160 vowel and consonant symbols, and is still used exclusively by the Norwegian Dialect Archive.

Jespersen produced a dialect alphabet for Danish, first published in the periodical *Dania* in 1890, and recently used in the Danish pronouncing dictionary. It follows the 'broad' principle, employing phonetic symbols without diacritics to represent the Danish sounds. Its reversal of the values assigned to ⟨a⟩ and ⟨ɑ⟩ in the IPA alphabet is a source of possible confusion.

5.11 The Alphabet of the International Phonetic Association

L'Association Phonétique Internationale, founded in 1897, grew out of two previous organizations: *The Phonetic Teachers' Association*, founded in 1886, and *L'Association Phonétique des Professeurs de Langues Vivantes*, which replaced it in 1889 (see MacMahon 1986). The first version of its alphabet, based on Pitman's alphabet of 1847 (as revised in 1876) and on Sweet's broad romic, appeared in 1888. From the beginning the emphasis was on practical use for language teaching. Consequently the symbols were chosen with a view to clarity, familiarity, and economy. The principles stipulated that 'there should be a separate sign for each distinctive sound; that is for each sound which, being used instead of another in the language, can change the meaning of a word' (i.e., for each phoneme). The symbols were to be letters of the roman alphabet as far as possible, with values determined by international usage, and when 'very similar shades of sound' were to be found in several languages the same sign was to be used. The use of diacritics was to be avoided, except for representing 'shades of varieties of the typical sounds,' because of the problem they presented for reading and writing. It was also stipulated that where possible the shape of new symbols should 'be suggestive of the sound they represent, by their resemblance to the old ones.' For example, the basic ⟨n⟩ shape was retained for the palatal, retroflex, velar, and uvular nasals [ɲ, ɳ, ŋ, ɴ].

Over the years the alphabet has been modified for use as a general phonetic resource, to make detailed phonetic transcriptions and comparisons of language sounds. Diacritics have been accepted as admissible for certain limited purposes. A thorough reappraisal has recently been completed (much of it reflected in articles in the *Journal of the International Phonetic Association* since 1987), and following the Kiel Convention 1989 additions and amendments have been made to the symbols, and to their presentation in chart form (see Fig. 6). The principles have been amended in certain respects, notably to make it clear that IPA symbols should not be seen simply as representations of sounds, but as 'shorthand ways of designating cer-



THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993)

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ	▨	ʔ ▨
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ	▨	▨
Trill	ʙ			r				▨	ʀ		▨
Tap or Flap				ɾ		ɽ		▨			▨
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative	▨	▨		ɬ ɮ						▨	▨
Approximant		ʋ		ɹ		ɻ	j	ɰ			▨
Lateral approximant	▨	▨		l		ɭ	ʎ	ʟ		▨	▨

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks		Voiced implosives		Ejectives	
ʘ	Bilabial	ɓ	Bilabial	ʼ	as in:
ǀ	Dental	ɗ	Dental/alveolar	pʼ	Bilabial
ǃ	(Post)alveolar	ʄ	Palatal	tʼ	Dental/alveolar
ǂ	Palatoalveolar	ɠ	Velar	kʼ	Velar
ǁ	Alveolar lateral	ʛ	Uvular	sʼ	Alveolar fricative

VOWELS

Front Central Back

Close i • y — ɨ • ʉ — ɯ • u

ɪ ʏ ʊ

Close-mid e • ø — ɘ • ɵ — ɤ • o

ə

Open-mid ɛ • œ — ɜ • ɞ — ʌ • ɔ

æ ɐ

Open a • ɶ — ɑ • ɒ

Where symbols appear in pairs, the one to the right represents a rounded vowel.

OTHER SYMBOLS

ʍ Voiceless labial-velar fricative
w Voiced labial-velar approximant
ɥ Voiced labial-palatal approximant
ʜ Voiceless epiglottal fricative
ʢ Voiced epiglottal fricative
ʡ Epiglottal plosive
ɕ ʑ Alveolo-palatal fricatives
ɺ Alveolar lateral flap
ɧ Simultaneous ʃ and x

Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.

k͡p t͡s

SUPRASEGMENTALS

ˈ Primary stress
ˌ Secondary stress
ˌfoʊnəˈtɪʃən
ː Long eː
ˑ Half-long eˑ
˘ Extra-short ĕ
. Syllable break ɹi.ækt
| Minor (foot) group
‖ Major (intonation) group
‿ Linking (absence of a break)

TONES & WORD ACCENTS

LEVEL		CONTOUR	
e̋ or ˥	Extra high	ě or ˩˥	Rising
é ˦	High	ê ˥˩	Falling
ē ˧	Mid	e᷄ ˦˥	High rising
è ˨	Low	e᷅ ˩˨	Low rising
ȅ ˩	Extra low	e᷈ ˧˦˧	Rising-falling
			etc.
↓	Downstep	↗	Global rise
↑	Upstep	↘	Global fall

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. ŋ̊

◌̥	Voiceless	n̥ d̥	◌̤	Breathy voiced	b̤ a̤	◌̪	Dental	t̪ d̪
◌̬	Voiced	s̬ t̬	◌̰	Creaky voiced	b̰ a̰	◌̺	Apical	t̺ d̺
ʰ	Aspirated	tʰ dʰ	◌̼	Linguolabial	t̼ d̼	◌̻	Laminal	t̻ d̻
◌̹	More rounded	ɔ̹	ʷ	Labialized	tʷ dʷ	◌̃	Nasalized	ẽ
◌̜	Less rounded	ɔ̜	ʲ	Palatalized	tʲ dʲ	ⁿ	Nasal release	dⁿ
◌̟	Advanced	u̟	ˠ	Velarized	tˠ dˠ	ˡ	Lateral release	dˡ
◌̠	Retracted	i̠	ˤ	Pharyngealized	tˤ dˤ	̚	No audible release	d̚
◌̈	Centralized	ë	~	Velarized or pharyngealized	ɫ			
◌̽	Mid-centralized	e̽	◌̝	Raised	e̝ (ɹ̝ = voiced alveolar fricative)			
◌̩	Syllabic	ɹ̩	◌̞	Lowered	e̞ (β̞ = voiced bilabial approximant)			
◌̯	Non-syllabic	e̯	◌̘	Advanced Tongue Root	e̘			
˞	Rhoticity	ə˞	◌̙	Retracted Tongue Root	e̙			

Figure 6. The most recent symbol chart of the International Phonetic Association (revised 1993).

tain intersections of...a set of phonetic categories which describe how each sound is made.' However it is still stated that 'the sounds that are represented by the symbols are primarily those that serve to distinguish one word from another in a language.'

6. Twentieth-century Developments

6.1 The 'Anthropos Alphabet' of P. Wilhelm Schmidt

This alphabet was first published in the periodical *Anthropos* in 1907, and revised in 1924. P. W. Schmidt (1845–1921) kept most of Lepsius's symbols, adding some diacritics to distinguish sounds left undifferentiated by Lepsius, but introduced the IPA symbols ⟨æ⟩, ⟨œ⟩ (and turned versions of them) and ⟨ɯ⟩, mostly to replace symbols with diacritics. In the consonants, to give some examples, ⟨s̭⟩ and ⟨z̭⟩ are used for the dental fricatives instead of Lepsius's ⟨θ⟩, ⟨δ⟩, and in his revised edition the inverted IPA symbols ⟨ʞ⟩ and ⟨ʇ⟩ replaced Lepsius's ⟨/⟩, ⟨//⟩ and ⟨!⟩. Interestingly, the 1989 revision of the IPA alphabet adopted Lepsius's click symbols (slightly modified).

6.2 Native American Languages

In 1916 the Smithsonian Institution published a pamphlet entitled *Phonetic Transcription of Indian Languages*, embodying the report of the committee of the American Anthropological Association, consisting of Franz Boas (1858–1942), P. E. Goddard (1869–1928), Edward Sapir (1884–1939), and A. L. Kroeber (1876–1960). They took as a basis the alphabet used by J. W. Powell (1834–1902) in *Contributions to North American Ethnology*, vol. 3 (1877). In 15 pages the pamphlet sets out general principles of transcription, and rules for a simpler and a more complete system. The principles closely resemble those of the IPA, such as the use of the same symbol wherever the same sound occurs, restrictions on the use of diacritics, harmonizing of fonts, and using symbols for sound values like those they customarily stand for. The simpler system is suggested for 'ordinary purposes of recording and printing texts,' and the complete one for the recording and discussing of complex and varied phonetic phenomena by specialists in phonetics. The full system of vowels is based on Sweet's 36 vowel system (excluding the 'shifted' vowels of his final system). Sweet's 'wide' vowels are normally shown by Greek letters, and 'narrow' ones by roman, but diacritics on roman letters are allowed as an alternative (e.g., the vowel in English *but* may be either ⟨α⟩ or ⟨å⟩). The consonant symbols and prosodic marks are not far different from those of the IPA; some exceptions are that small capitals are used for voiceless liquids and nasals, and also for stops and fricatives said to be 'intermediate' between surd (voiceless) and sonant (voiced). These include unaspirated voiceless stops. The total system is a sophisticated one providing both a high degree of precision in transcribing the detailed features of Native American languages, and also a satisfactory simple form for nonspecialists.

6.3 Jörgen Forchhammer's Weltlautschrift *(World Sound Notation)*

The 'World Sound Notation' of Jörgen Forchhammer (b.1873) was published in *Die Grundlage der Phonetik* (1924). It comprises a basic set of 44 *Lautgruppen* (sound groups, made up of 13 vowels and 31 consonants) each comprising a set of sounds which can be represented by the same letter. The nuances within each group can be shown by the wide range of diacritics, which include subscript numerals to indicate successive points of tongue contact along the palate. Thirty-six of the 44 basic symbols are identical with IPA symbols, but the diacritics are mostly different (see also Heepe 1983).

6.4 The Copenhagen Conference

In April 1925 a conference was held in Copenhagen, convened by Otto Jespersen, and attended by an international group of twelve specialists in different language groups, to try to establish a norm for a universal phonetic script. Their proposals were published in *Phonetic Transcription and Transliteration* (1926), and are reprinted in Heepe 1983. They firmly rejected the possibility of further iconic alphabets, and approved the notion of 'broad' transcriptions based on the phoneme. Their detailed proposals for symbols were given a somewhat cool reception by the Council of the IPA (reported in *le maître phonétique* (1927)), but the following were accepted:

(a) [ɸ β] for the bilabial fricatives (instead of [F ʋ]);
(b) [̫] for labialization (abandoned in the 1989 revision), and [̪] for dentals;
(c) [ʈ ɖ ɳ ɭ ɽ ʂ ʐ] for the retroflex series (following Lundell);
(d) [.] and [̣] to show closer and opener vowels respectively;
(e) a raised period [·] to show length;
(f) vertical stress marks [ˈ], [ˌ] instead of the oblique [ˊ].

Other proposals (rejected, or previously adopted, by the IPA), included [̢] for nasalization; a new diacritic for palatals; [δ] for the voiced dental fricative; [χ γ] for velar fricatives; [ᴋ ɢ ɴ ʀ ʟ] for uvular stops, nasal, trill, and lateral and [x ґ] for uvular fricatives; ['] for glottal stop; [△] as a diacritic for clicks. Among the suggestions for the vowels were: abandoning the use of [a] and [ɑ] to signify different vowels, use of superscript [˙] for central vowels (e.g., [u̇]), and umlaut for front rounded vowels, e.g., [ü ö].

6.5 Machine-readable Transcriptions

One major consideration in recent years has been the choice of symbols to represent speech in computer systems. The need to have symbols which are available on normal keyboards has led to various systems of machine-readable phonetic alphabets. Many of these are summarized in Wells (1987), which has a lengthy discussion of the main problems. The most easily available method of supplementing the lower-case roman alphabet is the use of upper case, and there is a fair amount of agreement among different schemes in allocating upper-case symbols to IPA symbols. Another area of common ground is the use of ⟨@⟩ for a central schwa-type vowel. Some numerals resemble IPA symbols, and may be substituted; for example, ⟨3⟩ may represent [ɜ]. (See also Esling & Gaylord 1993.)

Bibliography

Abercrombie D 1967 *Elements of General Phonetics*. Edinburgh University Press, Edinburgh

Abercrombie D 1981 Extending the roman alphabet: Some orthographic experiments of the past four centuries. In: Asher R E, Henderson E J A (eds.) *Towards a History of Phonetics*. Edinburgh University Press, Edinburgh

Copenhagen Conference 1925 *Phonetic Transcription and Transliteration: Proposals of the Copenhagen Conference April 1925*. Clarendon Press, Oxford

Esling J H, Gaylord H 1993 Computer codes for phonetic symbols. *Journal of the International Phonetic Association* **23(2)**: 83–97

Heepe M (ed.) 1983 *Lautzeichen und ihre Anwendung in verschiedenen Sprachen*. Helmut Buske Verlag, Hamburg

Kelly J 1981 The 1847 alphabet: An episode of phonotypy. In: Asher R E, Henderson E J A (eds.) *Towards a History of Phonetics*. Edinburgh University Press, Edinburgh

Lepsius C R 1981 *Standard Alphabet for Reducing Unwritten Languages and Foreign Graphic Systems to a Uniform Orthography in European Letters*, 2nd rev. edn. Benjamins, Amsterdam

Laziczius G 1966 Schrift und Lautbezeichnung. In: Sebeok T A (ed.) *Selected Writings of Gyula Laziczius*. Mouton, The Hague

MacMahon M K C 1986 The International Phonetic Association: The first 100 years. *Journal of the International Phonetic Association* **16**: 30–38

Sweet H 1880 Sound notation. *Transactions of the Philological Society*: 177–235

Wellisch H H 1978 *The Conversion of Scripts—Its Nature, History and Utilization*. Wiley, New York

Wells J C 1987 Computer-coded phonetic transcription. *Journal of the International Phonetic Association* **17(2)**: 94–114

Early Modern Instrumental Phonetics

Hans Günter Tillmann

In the middle of the nineteenth century in Europe, Ernst von Brücke in Austria and Alexander Melville Bell in England published their proposals for a systematic description of speech sounds on the basis of a new physiology of speech ('sound physiology'). Brücke's (1849, 1856) and Bell's discoveries (1863, 1867) formed part of the development of a new, scientifically based, discipline for the investigation of spoken language. This had more than one reason as will become apparent below. One of these reasons needs to be mentioned immediately, however, since it gave rise also to the academic name of the new discipline. (For an account of the many precursors to modern phonetics from the earliest times up to the late nineteenth century, see *Phonetics: Precursors to Modern Approaches*.)

The word 'phonetic' seems to have been used for the first time in the modern sense in 1797 by the Danish Egyptologist George Zoega. In his dissertation *De origine et usu obeliscorum* published in Rome, he used the adjective *phoneticus* in connection with the question as to what sound-forms in ancient Egypt the hieroglyphic signs on the obelisks stood for. The term was established in Europe 25 years later when Champollion succeeded in deciphering the hieroglyphic writing system. His solution concerning *l'alphabet des hiéroglyphes phonétiques employés par les Égyptiens* was a sensation, and more and more authors in Europe who dealt with the spoken form of languages and at the same time wanted to stress the specific differences between the spoken and written forms of languages decided to use the adjective 'phonetic' in the new sense.

Early modern speech science had four important sources: the academic development of historical linguistics and comparative philology, both themselves embedded in the evolution of modern sciences, especially the natural sciences; a new public interest in the distinction between written and spoken language which was motivated in particular by the increasing attention given to the learning and teaching of foreign languages; the cultural need for orthographic reform and standardization of writing, especially true at that time of German and English; and finally the politically and economically inspired interest in developing orthographies for still unwritten languages in the new colonies (see also *History of Phonetic Transcription*).

1. Early Discoveries, Assumptions, and New Questions

The rise of modern phonetics as an academic discipline is closely associated with publications by Brücke and Alexander Melville Bell (see above) confirming what many earlier writers had suggested, (though without the same background of knowledge of the physiology of speech), namely that the alphabetic units of writing could be related in a very systematic way to certain observable properties of the articulatory production of speech. Speech science started as sound physiology and was based on a method called 'direct observation.' It was assumed that the phonetic value of any given alphabetic unit could be unambiguously determined by looking at the articulatory speech organs during the pronunciation of these units. Moreover, 'direct observation' was not restricted to single speech sounds but also meant the visual, auditory, and tactile inspection of whole running speech acts.

1.1 Sound Physiology and Articulatory Phonetics

1.1.1 Observable Alphabetic Units: Letters and Sounds

Before precise phonetic terms and concepts had become established, such a simple distinction as that between letters and sounds was not at all a trivial one, even for professional linguists. Jacob Grimm, for instance, entitled the first chapter of his famous German Grammar (1822) *Die Lehre von den Buchstaben* (theory of letters), and here the term *letter* meant both the printable form of a letter and also the sound it stands for when used in a text. It should be mentioned that Grimm changed the title of the first chapter for the third edition (1840) into 'Lautlehre' (theory of sounds). (For an account of early uses of the term 'letter' in English and in other languages, see Abercrombie 1965.)

Letters were generally understood as names of speech sounds. However, the sounds of fluent speech in running speech acts disappear again at the very moment that they are created by the speaker. Thus the text of an utterance which could be written down from left to right in the form of a linear sequence of alphabetic units seemed to early phoneticians to be the only durable object of observation for scientific investigation. Thus they never called into question the existence of alphabetic units as such.

1.1.2 Naive Assumptions About Letters and Sounds: A Basic Postulate and Two Presuppositions

The theoretical argumentation in Brücke (1856) is very explicit on this point. All letters of a good orthography which is in agreement with pronunciation should be signs which represent real sounds. Sounds constitute the values of an alphabetic sign just as numbers are the value of figures. Brücke was able to propose a new method for characterizing the sound value of given speech sounds. 'The time has come,' he writes, to present the 'natural value' of speech sounds and to explain the 'natural connection' between the sounds and their signs. The value of a given sound is determined by its properties which are called 'attributes.' Here it is of interest to note that Brücke distinguishes two different ways of finding the attributes of given sounds: one possibility is to look at the sounds (represented by letters) to see 'how they affect their neighboring sounds, and how they are themselves affected by these,' and one can also 'follow the changes they suffer during the course of time and through their going over from one language into another [...]. This is the way of the linguist' (1856: 1). A different possibility is given by the method of direct observation which 'is the way of the physiologist': direct inspection of the production of speech sounds and experiments concerning 'the manner and condition of their formation' lead to the desired attributes.

Here the first fundamental postulate of early speech science can be stated. It consisted in the naive assumption that single speech sounds do exist in reality, as alphabetical elements. The nature of this reality was not questioned, simply because it was taken for granted that any given speech sound could be represented by a proper alphabetic symbol. Speech research was mainly devoted to the single aim of determining the relevant attributes, such that alphabetical elements with identical attributes could be represented by just one proper symbol.

This postulate had two presuppositions. It was assumed, first, that speech could be exhaustively investigated as a purely mechanical process, and secondly that the listener could be replaced by a deaf observer. Both these presuppositions can be clearly confirmed in the works of Brücke and Bell.

1.1.2.1 A Purely Mechanistic Approach

Brücke developed his theory of sound physiology with explicit references to earlier pioneers of speech research, two of whom must be mentioned here: Wolfgang von Kempelen with respect to the production of consonants, and Robert Willis with respect to the formation of vowels. After many years of work, von Kempelen was the first to succeed in constructing a mechanical system for synthesizing artificial speech. A native speaker of Hungarian, he worked at the court in Vienna where in 1791 he published his famous book about the mechanism of human language including the description of his speaking machine. Brücke admired this marvelous work (facsimile reprinted in Kempelen 1970) and prized it as 'one of the best physiological books' he knew, and he recommended that all those linguists should read it who 'want to make themselves thoroughly acquainted with the purely mechanical part of sound theory' (p.6). Whereas linguists at that time still tended to use more or less metaphorical expressions in their characterizations of speech sounds (Grimm, for instance,

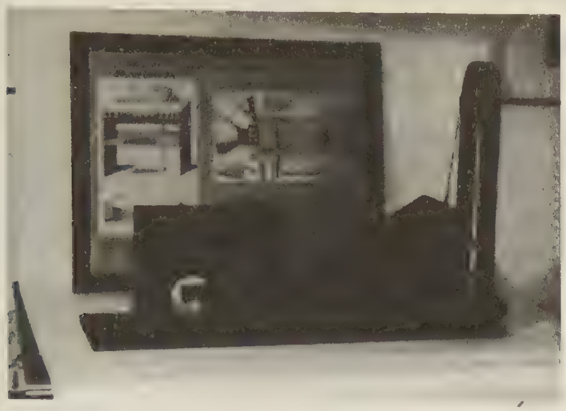


Figure 1. 'For a speaking machine no more is required,' thought von Kempelen (p.398), 'than a lung, a glottis, and a mouth.'

called consonants the 'bones and skeleton' and vowels the 'blood of the organism' of a language), Brücke insisted on reducing the 'wondrous mechanism outpouring the stream of speech' to the physical laws which determine the mechanical structure and function of the human speech organs. He probably saw and heard a model of von Kempelen's speaking machine, which many years later was moved from Vienna to Munich, where it can still be found in the archives of the German Museum.

How von Kempelen succeeded in the acoustic modeling of human sound production has been described in Dudley & Tarnoczy (1950) (see also *Phonetics: Precursors to Modern Approaches*). From a purely mechanical point of view his speaking machine is a simplified copy of the human speech organs in the form of an instrument that can be manipulated by two hands and the right forearm. As shown in Fig. 1 it consists of bellows and a box containing the speech sound articulating system.

The box has two circular windows for inserting the right and left hands (Fig. 2). Those who only know the speaking machine from the drawings (as, for instance, in Dudley & Tarnoczy 1950) will be surprised how small the speech sound articulation system actually is in reality. It has the dimensions of the human vocal tract. As soon as the right forearm pushes the bellows which are pulled up by the weight of an iron ball, a rather high, croaky (female) phonation sound is heard. The left hand can be used to open and close the artificial mouth or to perform different degrees of mouth opening for the production of different vowel-like sounds. As Brücke pointed out, the resulting vowels were not very convincing, mainly because the principles discovered by Willis (1830) were not yet known to von Kempelen (cf. Sect. 3 below, and *Phonetics: Precursors to Modern Approaches*). With the fingers of the right hand one could push different levers to produce audible fricatives within the artificial mouth. Two small artificial nostrils could be opened or closed to produce nasal or oral sounds. Von Kempelen himself was sufficiently trained to be able to play his instrument in such a way that listeners could recognize single Hungarian and German words.

The general conclusion that was drawn from the possibility, in principle, of constructing an artificial speaking machine was that human speech could be explained and also wholly described as a purely mechanical process. This is the first presupposition, referred to earlier, underlying the postulate of the direct observability of given speech sounds, and this was also the central theoretical assumption made by Carl Merkel (1812–76) when he systematically collated current anatomical and physiological knowledge about the

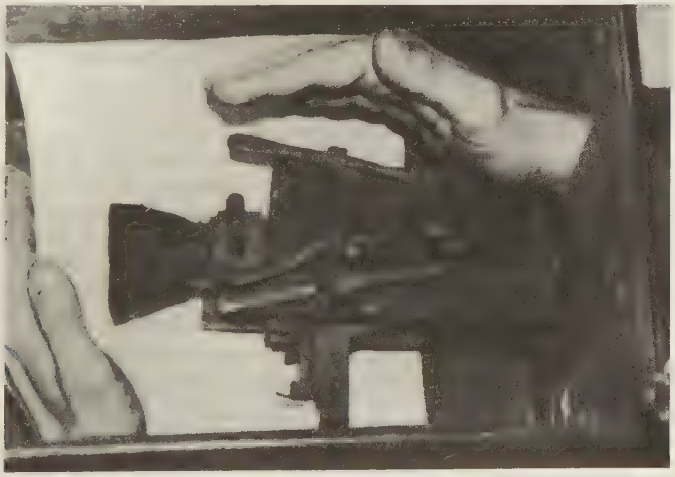


Figure 2. 'Speech or articulation is nothing more than the passage of voice through various openings' (von Kempelen, p.397).

'human voice and speech organs' in his *Anthropophonik* (Merkel 1857).

1.1.2.2 Speech Sounds as Visible Units

The second presupposition of the postulate had to do with the observation that all the different, individual speech articulating systems could be reduced to one generalized abstract mechanical system consisting of certain parts in a particular configuration. Each individual speaker must make use of his lips, his tongue, his velum, etc. in a certain way in order to produce a certain speech sound, and conversely each given speech sound can be analyzed into certain individual actions of certain parts of the generalized system. For the early sound physiologists it was a very surprising discovery that all possible speech sounds could be compared with each other in relation to such a generalized system and thereby exhaustively analyzed into a set of identical or different articulatory components. The nasals [m, n, ŋ], for instance, share with the stop consonants [b, d, g] their respective place of articulation as well as their articulatory organ, but these two sets of sounds are distinguished from one another by their respective manner of articulation: [m, n, ŋ] are produced with closed mouth passage and open nasal passage (lowered velum), while for [b, d, g], in addition to the mouth closure, the velum is raised to close the nasal passage, which is a necessary condition for the articulation of any plosive (including, of course, the corresponding voiceless ones: [p, t, k]).

It must be emphasized that this possibility of analyzing articulated speech sounds was known over 2,000 years earlier to the ancient Indian phoneticians (see *Ancient Indian Phonetics*), and to many later investigators of speech in the West (see further in *Phonetics: Precursors to Modern Approaches*). Brücke himself was familiar with the Spanish tradition of language teaching to the deaf, dating back to the sixteenth century, and mentions Pietro Ponce, a Benedictine monk who died in 1584. In the Vienna court library Brücke had discovered a work of a successor of Ponce, Bonet (1620), 'the oldest work on teaching the deaf we have' (Brücke 1856: 15). He also knew the *Tractatus grammatico-physicus de loquela* (1653) of John Wallis (see *Phonetics: Precursors to Modern Approaches*) who began to teach two deaf pupils in England one hundred years after the Spanish pioneers. So the original contribution of the sound physiologists to speech science was not that they discovered articulatory phonetics, but rather that they drew systematic conclusions from the earlier discoveries. Their discovery, one may say, was that speech sounds generally can be described from the viewpoint of a deaf observer. Bell clearly indicated in 1867 that this discovery was a central issue for the early speech scientists, when he gave to what can be described as the second standard work of the new speech science the title *Visible Speech: Universal alphabetics or self-interpreting letters for the writing of all languages in one alphabet.*

1.1.3 The Successful Articulatory Description of Single Speech Sounds

Looking back on the early development of speech science it must be recognized that the great successes of articulatory phonetics were mainly restricted to the description of isolated speech sounds. The first sound physiologists did not really look at running speech acts, nor did they investigate concrete, physiological data. They spent most of their time sitting at their desks and observing themselves while repeating the pronunciation of isolated words with a very careful articulation. Thus they discovered very fine distinctions between the different sounds of different languages and gave very reliable articulatory descriptions of possible differences between alphabetically isolatable speech sounds. Tactile perceptions were translated into the visualized model of the articulatory organs.

What the eye could not see directly was, as far as possible, made visible by auxiliary means. As far back as 1803 Erasmus Darwin, grandfather of Charles Darwin, devised a method for investigating the formation of vowel sounds by inserting into the mouth cylinders made of tinfoil which received different impressions according to which vowel was spoken (see Darwin 1803: 120). Grützner (1879) was the first to experiment with painting the tongue before producing a certain sound in order to look at the colored parts of the hard palate, with the aim of specifying the areas of contact. Oakley Coles (1872), Kingsley (1880, 1887), and Lenz (1888) refined the method of inspecting directly or indirectly produced palatograms to determine the tongue palate contacts of certain sounds. This kind of method is still in use in the 1990s. Other methods had to be introduced to get a clearer picture of those speech sounds that do not have palatographically illustratable places of articulation. Grandgent (1890, 1892) tried to determine the distance between the tongue and the hard palate. Only a few years later, Atkinson (1899) invented a very delicate instrument for obtaining real mouth-mappings. His method of creating so-called 'longitudinal stomatograms' made use of a thin wire which could be moved within a fixed guiding construction to the point of 'touch-sensation of the tongue' which could then be translated into the drawn picture showing tongue distances from the palate.

Pictures of the tongue and the hard and soft palate were of special interest in cases where authorities on descriptive phonetics adopted a divergent or even contradictory view about a certain detail. Thus, for instance, Sievers, Viëtor, and also Sweet agreed in believing that the high front unrounded and rounded German vowels [i] and [y], [e] and [ø] also differ in their tongue height, whereas Jespersen assumed (more

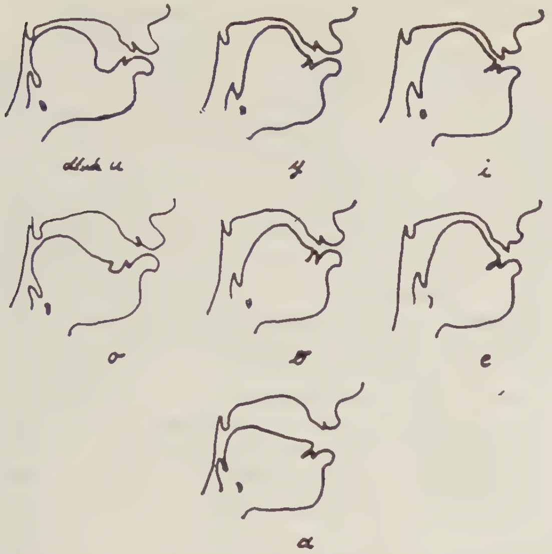


Figure 3. 'My observations regarding the growth of my hair made it appear prudent to restrict the X-ray recordings to not more than two per week' (Meyer 1907: 233).

from a theoretical point of view) that the only linguistically relevant articulatory difference between these pairs of vowels consisted in their lip position. Here E. A. Meyer—only ten years after the discovery of the X-rays by Röntgen—was the first to produce very clear radiographic pictures of German vowels and consonants (cf. Fig. 3). After having put small leaden plates on the tongue and palate Meyer exposed himself to X-ray photography. The exposure time for one single speech sound was about one minute (see the quotation in the caption of Fig. 3). During this time the depicted vowel or consonant was reproduced in a fixed steady state, with a duration of about 8 seconds and was repeated between 6 and 8 times. (Meyer was much too optimistic about the safety of X-ray photography—he thought that if the hair of the subject was protected by tinfoil folded many times and if the two sides of the head were each alternately exposed only once a week 'any detrimental effect to the body of the subject could be ruled out' (p.233).) In his famous contribution to Viëtor's Festschrift, Meyer (1910) proposed another noninvasive method for getting good pictures of the form of the tongue and its distance from the palate: he fixed little threads of nonelastic tinfoil along the midline of an artificial palate and constructed a mechanism for transducing the received tongue impressions into drawn contours.

With these two techniques Meyer was able to demonstrate that a speaker of northern German did indeed show small but systematic differences in the tongue height during the production of high front rounded and unrounded vowels. As can be gathered from Fig. 3, the raising of the tongue during the production of [y] was clearly less than for [i] and nearly as low as for [e]; and the vowel [ø] clearly had a lower tongue position than was found for [e].

The articulatory description of isolated speech sounds is undoubtedly very helpful in the context of teaching the pronunciation of a given language. Anyone who knows how to produce the alphabetic units of a given language in isolation is also in a good starting position for incorporating them in the reproduction of whole words, especially in the clear speech of citation forms. On the other hand, it must be said that the sound physiologists and descriptive phoneticians were never troubled by the fact that alphabetically represented sound structures as found in the citation form of isolated words are subject to more and more reduction in colloquial speech. The reductions and elisions of fluent speech are inconspicuous to the naive observer simply because it is much too complex and runs much too fast for direct observation of it in all its detail. Thus the success of early sound physiology and articulatory phonetics was restricted to the description of more or less careful speech, and especially of the citation forms of isolated words and of single speech sounds uttered in isolation.

1.2 An Early Experiment with Isolated Speech Sounds

In 1871 the medical doctor and ear specialist Oskar Wolf published a book entitled *Sprache und Ohr*. He had observed that patients with different degrees and different kinds of hearing losses had different problems in the perception of different speech sounds, and he wanted to know how a normal listener was able to perceive the set of speech sounds he used in testing the hearing abilities of his patients. Thus he was probably the first to conduct an articulation index experiment.

Wolf decided to determine the auditory perceptibility of 18 speech sounds presented partly in isolation, partly in a consonant vowel context. The alphabetically specified categories of these sounds were taken for granted; they constituted the independently given variable. To obtain a dependently variable measure of auditory perceptibility Wolf conducted the experiment he describes on page 59 of his book. He asked a trained professional speaker and two professional musicians to take part in the test. The professional speaker took up his position at the end of a long avenue of trees, in calm conditions, and was instructed to produce each of the test stimuli with equal effort. One of the two musicians stood beside him and was instructed to monitor the realized effort of the stimulus production. The other musician served as test subject. He had to take steps forward and backward along the avenue in order to determine the step distance where the test items could still be clearly identified. The resulting step distances can be seen in Fig. 4 in the (reprinted) original form.

Schematische Darstellung des Tonstärkeverhältnisses der Sprachlaute

Sprachlaut*	Wird noch deutlich unterschieden in einer Entfernung von Schritten	Bemerkungen
A	360	* Im Freien in einer Allée zur Nachmittagszeit gemessen.
O	350	
Ei**	340	** Klingt meist wie Ai.
E	330	
I	300	
Eu	290	
Au	285	
U	280	
Sch	200	
M und N***	180	*** In Verbindung mit dem Vocale A.
S	175	
F	67	
K und T	63	
R****	41	**** Das Zungenspitzen-R für sich
B	18	
H*****	18	***** Für sich als verstärkter Hauch.

* measured in open air in an avenue in the afternoon.

Figure 4. Wolf's original sonority scale of 18 German speech sounds.

Wolf's experiment had a very strong influence on the further theoretical development of phonetics as an experimental discipline. Despite certain methodological deficiencies it showed that in principle it was possible to characterize the speech sounds under examination by means of independent measures.

Eduard Sievers (1876), and later Otto Jespersen (1904), used the sonority scale invented and experimentally determined by Oskar Wolf to formulate their phonetic syllable theories. They assumed that the syllabic prosody of speech could be understood as a function of the degrees of sonority in pronounced sound sequences, with the vowels forming the sonority peak in the center of the syllable and the marginal consonants creating troughs of sonority between the peaks.

1.3 Segmental States and Fast Intersegmental Transitions

Phonetics as established during the second half of the nineteenth century, as a branch of linguistics, had two main orientations: a theoretical one and a more practical one. The success of the latter mainly consisted in the practical application of the new articulatory categories to produce reliable phonetic transcriptions. The French phonetician Paul Passy was one of the initiators of the famous Association Phonétique Internationale (API)/International Phonetic Association (IPA)/Weltlautschriftverein (WLV), founded in 1886 (see *History of Phonetic Transcription*). One year later, in Marburg, Wilhelm Viëtor started the first important, international journal of the new discipline, entitled *Phonetische Studien. Zeitschrift für wissenschaftliche und praktische Phonetik mit besonderer Rücksicht auf den Unterricht in der Aussprache*. Both orientations are specified in the subtitle of the journal, and the practical aspect of teaching pronunciation is also particularly mentioned. The number of the cooperating persons whose names were printed on the cover increased within two years from over 50 to nearly 90. This 'editorial board' contained the names of practically all the leading phoneticians of the time including Bell, Brücke, Ellis, Jespersen, Lloyd, Lundell, Noreen, Passy, Storm, Sweet, Techmer, and Winteler.

The theoretically oriented scientific branch of phonetics developed in close relation with the continuing rise of the natural sciences, but was at the same time strongly influenced by new programmatic concepts of linguistic theories. The more the new phonetic knowledge became available to linguists, the greater was its role in helping them to comprehend and explain the processes of sound change in the evolution and branching of documented historical languages. With the neogrammarian school of comparative philology the new insights provided by sound physiology and the articulatory description of speech sounds became an integral part of linguistics, and phonetics gained basic concepts from the theories of historical linguistics for its further scientific development.

Eduard Sievers (1850–1932) can be regarded as the phonetician of the neogrammarian school of comparative historical linguistics. His book on the principles of sound physiology was written as an introduction to the study of the sound theory (Lautlehre) of the Indo-European languages. First published in 1876 (in later editions the term 'Lautphysiologie' in the title of the book was replaced by 'Phonetik') it had a strong influence in two directions: first on the further development of theoretical linguistics, and second, regarding a new theoretical foundation for phonetics as a linguistic discipline. At the same time, Sievers, like Techmer (see below), anticipated the creation of instrumental and experimental phonetics in a programmatic way.

1.3.1 Analysis versus Synthesis

An important new issue in the development of speech science was the theoretical distinction between speech analysis and speech synthesis. Alphabetically representable speech sounds were no longer understood as directly observable, but rather as the elementary results of an abstracting analysis. As soon as these elementary units of speech description were used for the representation of real speech, it became clear that additional phonetic properties of speech had to be specified. One of the questions typically asked in this connection was, for instance, how the uniform elementary units of a sound alphabet could be used to generate such differently sounding utterances as those of English, French, or German. (One of the answers given to this interesting question consisted in simply assuming a different language-specific general setting of the articulatory organs, the so-called 'basis of articulation,' 'Artikulationsbasis.')

Speech synthesis not only meant putting together alphabetic units into real syllables, words, and sentences, but also the description of the different prosodic and rhythmic organization of speech utterances. In particular, the assumed fast transitions between the assumed steady sound segments were thought to play an important role in historical sound changes. In this respect, assimilations and dissimilations in the phonetic formation of individual words gained special interest, of course.

Sievers—and later Jespersen—understood the distinction between analysis and synthesis not only as a fruitful heuristic program, but also as absolutely necessary for understanding and describing the physical reality of speech. In 1884 Friedrich Techmer (1843–91) attempted to formulate a complete theory of phonetic speech communication (see also *Phonetics: Precursors to Modern Approaches*). His 'scientific analysis and synthesis of audible language' is still very modern ('scientific' is meant in the sense of natural sciences: *Naturwissenschaftliche Analyse und Synthese der hörbaren Sprache*). Techmer distinguishes seven stages involved in the 'cycle of audible language' on its 'way from inside to outside' and 'on the way from outside to inside.' He gives a detailed description of these stages taking into account all knowledge available to him at that time. At the respective stages 1/7, 2/6, 3/5 he describes the psychic, psycho–physical, and physiological activities within the communicating organisms and at stage 4 the physical processes outside of them. A central role in the generative process of speech synthesis is played by the syllable. Accordingly speech sounds are characterized by means of a threefold dichotomy. Each speech sound is physiologically either 'Mundöffner' (mouth opener) or 'Mundschließer' (mouth closer), physically either 'Klang' (complex tone) or noise, and perceptually either 'Phon' or 'Symphon.' All vowels are 'mouth openers,' 'Klang,' and 'Phon.' Techmer's important work served as a model twenty years later when Scripture wrote his standard work on experimental phonetics, which also contained a complete theory of speech communication.

1.3.2 Theoretical Assumptions Leading to Early Instrumental Phonetics

When Sievers (1893) in the preface to the fourth edition of the *Grundzüge* showed himself not to be too enthusiastic about the 'new experimental phonetics of recent years' he did not seem to realize that the turn in this direction was also a consequence of certain basic theoretical assumptions about speech science which he and his linguistic colleagues had introduced and advocated in their publications in the years before, especially in connection with the explanation of sound change.

First the typical view of speech perception as subjective as opposed to speech production as objective will be mentioned. According to this—almost behaviorist—view a listener was often considered as only 'believing that he heard something,'—something that in reality was not objectively present. Sievers observed that naive listeners, in particular, were normally systematically misled into hearing the sounds of their own dialects, and he therefore very insistently argued that linguists should train their ears as much as possible in order to learn to hear the relevant articulations. Techmer points out that thanks to the new instruments 'we now are able . . . to control the ear through the eye.' Speech perception was not an interesting problem in its own right, its only task was to transport the speech sounds 'on their way from outside to inside.'

The second assumption is the most important in the context of this article. It is concerned with the concept of infinitely fine sound varieties in the transitions between steady state sound segments. Sievers (1876) argued that given a sound sequence such as [la] or [al] it is

> intuitively obvious that during this transitional movement neither the pure a-sound nor the pure l-sound can exist, but that rather between the pure a produced at the beginning and the l at the end a continuous series of transitional sounds must be interposed. (p.85)

Because these transitional sounds ('Übergangslaute') were assumed to be much too short for them to be heard, the only conclusion to be drawn was that one should use instruments for getting a description of all the postulated relevant variants.

A third very general—and, from the point of view of the late-twentieth-century theory of science, also very naive—assumption was that there exists just one, objectively given, reality of speech acts, a 'real reality' in the physical world, which at the same time constitutes the contents of subjective (and imperfect) perception and of objective scientific description. A peculiar consequence of describing a physically given world with normal words was that the continuous and transitory process of speech articulation was automatically segmented according to previously given categories, such as places of articulation at which an articulatory organ produces just one of the given possible manners of articulation. When this epistemological paradox became clear to Otto Jespersen he invented a new system of phonetic description (1889) which worked without 'semantically segmenting' categories such as manners and single places of articulation (for this analphabetic notation see *History of Phonetic Transcription*). In an analphabetic representation of speech the whole configuration of the articulatory speech production system from the lungs to the lips is given, either as fixed within a time segment or as a transition from one configuration to another.

It was precisely the naive identification of two realities, one of them being measurable by means of instruments in the physical world, and the other being what linguists described phonetically as observable speech sounds, that provoked the emergence of instrumental phonetics. Some thirty years after Jespersen's use of the analphabetic notation to represent the articulatory synthesis of speech, one of the leading Dutch speech scientists, Zwaardemaker (1927), tried to realize a complex kymographic system for graphically producing a directly measurable analogue of this analphabetic notation.

2. Early Instrumental and Experimental Work

After the very successful eras of sound physiology and articulatory phonetics, a new generation of speech scientists showed a growing distrust of the methods of direct observation and direct transcription. Shortly before the last decade of the nineteenth century they had begun to use new types of instruments to measure speech data. In most cases they recorded time functions representing either the movement of certain articulatory organs, or the acoustic speech output, resulting in an oscillogram of the speech wave in a somewhat restricted and not yet analyzed form.

The method of direct observation was replaced by the method of indirect measurement. At the beginning of the twentieth century the mainstream of speech science had definitely left the domain of comparative philology and linguistics and was moving into the domain of the natural sciences. Within a short period of time several new laboratories for experimental phonetics were established at different universities in Europe and the United States. The new approach of experimental phonetics was to study speech sounds exclusively in the form of the graphically presented speech curves which could be produced by equipment specially developed for the purposes of instrumental phonetics. The possibility of transforming transient speech into the graphic curves of measured speech data which remained stable for closer inspection introduced a new kind of experimental work into the mainstream of speech science, work which in principle was based on arbitrarily reproducible observations made under controlled repeatable conditions with systematic variation.

2.1 Measurable Speech Movements and Readable Speech Curves

Ten years after Marey had published his *Méthode graphique dans les sciences expérimentales* (1878) in Paris and Leipzig, two young linguists, independently of each other, were the first to try to make use of the proposed method in speech science: they used it to transform transient speech utterances into persisting graphic registrations, and they were both interested in getting as precise a description as possible of a particular dialect; Wagner (1891) of a dialect in South Germany, Rousselot (1891a) of his own Gallo–Roman dialect. Wagner tried to measure certain sound durations in order to determine the quantity relations in the sound system of his dialect. E. A. Meyer (1898a) reanalyzed his data and also improved the instruments used by Wagner in order to get more reliable measurements.

In the first chapter of his dissertation Rousselot produced a great variety of graphic speech curves for detailed inspection and description. He certainly believed that speech utterances could be reliably and authentically replaced by these rather poor graphic registrations and he obviously liked the art of reading these curves, *la lecture des tracés*; a great part of his later work consisted simply in presenting, and using his skill in 'reading,' speech curves. One may say that he invented a new kind of 'speech curve philology.' Thus his publications were full of phonetically interesting individual observations. Scripture (1902), in his broad, systematic attempt to present the new discipline of experimental phonetics as a central part of experimental psychology in the tradition of Wilhelm Wundt, quotes no less than thirty of these observations.

There is yet another reason why Abbé Rousselot was so successful in directing the main stream of speech science into experimental phonetics. The interest in reading speech curves constituted a new scientific program. The aim of Rousselot was not to find the invariant common features of a given sound in different realizations, but on the contrary to discover differences in the realizations of a given sound in the pronunciation of a given word. Most of his material consisted of lists of words or short word sequences. This new program was already clearly expressed in 1891 in the title of his dissertation, *Les modifications phonétiques du langage* (1891a), and in another contribution from the same year, entitled *La méthode graphique appliquée à la recherche des transformations inconscientes du langage* (1891b). Rousselot presented his arguments for this new kind of speech curve philology. All sound changes in the histories of all languages, he maintained, are caused by phonetic modifications unintentionally produced by the speak-

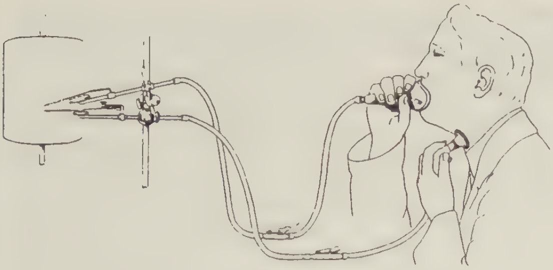


Figure 5. Kymographic recording of mouth airstream and glottal vibration (from Panconcelli-Calzia 1924: 14; © Walter de Gruyter, Berlin. Reproduced with permission).

ers, and the resulting 'subliminal transformations' in the phonetic form of the utterances can only be studied after they have been made visible in the registrations produced by the new graphic method.

2.1.1 The Kymograph

The registrations of speech curves were produced by an instrument called the 'kymograph.' In the development of instrumental phonetics it played a role similar in its importance to that played 50 years later by the sonagraph. It could be used for the registering of rather slow air pressure variations up to about 500 Hz. It consisted of a drum which was covered with smoked paper and was kept in constant revolution by means of clockwork during registration. So-called 'Marey tambours,' flat circular metallic boxes with a rubber top and a side tube, were used to receive and transduce the air pressure variations. A light lever, usually of straw, was fixed to the rubber membrane at the top of the tambour to follow its movements, which were simultaneously inscribed onto the revolving smoked paper by means of a light quill at the end of the lever. The membrane of the tambour reacted to the air pressure either directly or indirectly. The first case is shown in Fig. 5 where the speaker presses a funnel around his mouth in such a way that the resulting air stream from the mouth is conducted directly through a rubber tube into the tambour. In the picture shown, the glottal vibrations are indirectly transmitted to a second tambour.

For recordings of the movements of the lips or the jaw, direct and indirect methods could be used. In the latter case levers fixed to the articulatory organs had first to transmit their upward and downward movements to the membrane of a receiver tambour. The resulting air pressure variation was then transmitted through a rubber tube into a second recording tambour at the site of the kymograph. The indirect method could also easily be used for the registration of the vibrations of the larynx during the production of voiced speech sounds. In this case, the membrane of the receiver tambour could be applied directly to the neck, as shown in Fig. 5.

Whereas Rousselot and most of his colleagues and followers were quite confident of the reliability of the resulting kymograms as measurements of the articulatory speech processes under investigation, Meyer (1898b) rigorously analyzed the problematic time constants of the system and showed how limited the use of the kymograph actually was for a precise measurement of the underlying time functions. He took the limitations of the kymographic system into serious consideration when he used it for determining the perceptual centerpoint of syllables in rhythmic speech production by simultaneously recording kymograms of the mouth airstream and of hand tapping. Meyer argued that in reality the production of words and sentences involves movements of the articulatory speech system far more complex and complicated than can be seen even from a large set of simultaneously taken kymographic recordings.

2.1.2 Simultaneous and Successive Speech Movements

It is impossible to sum up all the individual observations and speech measurements that were made by use of the kymograph during the first forty years of the twentieth century. One could easily fill a database with the published results, even though in many cases it would then be less easy to classify these results according to the concepts and categories of late-twentieth-century speech science, which were not available to the early instrumental phoneticians. In other cases the results of kymographic investigations have led directly to, or have at least strongly influenced, the development of certain modern concepts. Details of measurements of the specific velocity of different articulatory organs such as the upper and lower lip, the tip and the body of the tongue, the velum, and many other very interesting data, collected by Louise Kaiser from a large population of Dutch students may be found in Kaiser (1934, 1943).

There is one more general aspect of kymographic work that needs to be mentioned and exemplified. Typically more than one time function was recorded at the same time. Rousselot argued that only the comparative inspection of several simultaneously taken speech curves could help to reveal what he called a 'registration error' (*erreur d'inscription*). For him and his closer colleagues the speech curves had to be interpreted in relation to the underlying articulatory processes, and only if this interpretation led to a clear picture would the kymograms be regarded as usable. This was especially true when the curve reader had to draw segment boundaries between the individual speech sounds. In this case only the comparative inspection of several simultaneously recorded curves was accepted as giving the relevant hints. If a segment boundary could not be determined unambiguously the kymograph was said to have failed, and the faulty kymogram was replaced by a new and better one. This highly questionable methodology had to be adopted by all those who wanted to measure sound or syllable durations and the like. Those who decided for methodological reasons that the instrument used could not make mistakes had to draw the conclusion that the phonetic form of speech is itself nothing other than a continuous movement.

2.1.3 Different Voice Onset and Voice Offset Times

Comparing a French and a German speaker articulating simple CV-sequences such as [ba] and [pa], with a voiced or voiceless stop followed by a vowel, Rousselot (1897–1908: 454–56) discovered that they showed a typically different voicing behavior in the production of the stops. He compared kymograms containing the airstream curve of the mouth and the vibration curve of the larynx. With modern knowledge about the distinctive function of the onset of laryngeal phonation relative to the point of stop release in the mouth, Rousselot can be said to have discovered that the French speaker produced the voiced stop with negative voiced onset time (VOT) and the voiceless one with zero VOT, whereas the German had zero VOT in the case of the voiced stop and a clear positive VOT in the case of the voiceless stop. But it must also be recognized that Rousselot did not look at these differences from a functional point of view. His conclusion was that such theoretical distinctions as the one between voiced and voiceless stop consonants can be realized by quite different phonetic forms in different languages or dialects. That the phonemic principle, according to which a distinctive opposition is created between minimal pairs of words, did not play any role for Rousselot can be inferred from the fact that he discovered and described different voice onset and offset times in those situations also where they did not have any contrastive function. His final conclusion was that in addition to the voiced and voiceless consonants, intermediate sound variants must be introduced. In French he called them 'demi-sourdes' and 'demi-sonores.'

That the linguistic function of the observed voice onset and offset times was not really a central issue for the early instrumental phoneticians can also be inferred from Panconcelli-Calzia (1919). He argued that the use of words like 'semivoiced' or 'semivoiceless' is too vague to describe all the possibly occurring situations in a precise way. He proposed to characterize both the degree and the place of voicing by means of two measures, *pi* and *tau*. The measurement of the voicing degree, *pi*, was also explicitly called '*Phonoposotometrie*,' whereas *tau* was the value of the so-called '*Phonotopometrie*' chosen to determine the local stretch of voicing within a given segment. To get normalized values, the length of any given segment under consideration was divided into ten equal parts. Thus the normalized degree *pi* of voicing could vary in steps from 0 to 10. The *tau* value then, of course, is of interest only if the *pi* value differs from 0 or 10; $pi=0$ indicates no voicing at all and $pi=10$ indicates voicing throughout the whole segment. The topometric *tau* value determined the beginning and length of the voicing stretch, again in steps of 10 percent of the segment duration. In Fig. 6 (reproduced from Panconcelli-Calzia 1924), a dozen pairs of speech curves illustrating different voicing situations can be seen. The upper curve of these pairs always shows the airstream time function from mouth or nose, the lower one is always the larynx curve showing or not showing glottal vibrations. Only curves #1 and #11 demonstrate a completely voiceless and a fully voiced sound segment. Examples #3, #7, and #12 are voiced only in the initial part of the segment, examples #2, #5, and #9 show voicing only in their final part, curves #4, and #10 depict segments with a devoiced central part of the segment, whereas curve pair #8 has voicing vibrations only within its central part.

Panconcelli-Calzia knew that from a linguistic point of view the importance of his absolute *pi* and *tau* measurements was only of a

> relative nature. Because in a language where certain sounds show voicing with a degree of pi = 10, sounds having pi = 5 [. . .] must be considered as voiceless,

while in another language,

> where pi in optimal cases is equal to 5, all sounds with pi-values of 4 or 3.5 must be considered as voiced
> (Panconcelli-Calzia 1924: 45)

This quotation shows that the linguistic function of VOT, while not playing a central role, was not totally neglected.

2.1.4 Measured Durations of Sounds, Syllables, and Words

As soon as segment boundaries were drawn across the speech curves of a kymogram, the duration of the resulting sound segments could be very easily determined. In fact, this type of quantitative speech data gave rise to a large number of investigations which produced many interesting results. Only a few of them can be briefly mentioned here.

The first surprising fact which could be directly observed in the measured data itself was the great amount of variation in segmented durations. Variation as such was of interest for the reasons already mentioned, especially for those concerning the possibility of explaining sound change. But there was also the question of whether one could discover the systematic factors behind the observed variation.

Rousselot (1891a) was the first to try to answer this question in an experimental way. He chose nonsense words as test items and systematically varied their phonetic structure. In VCVCV test items with the

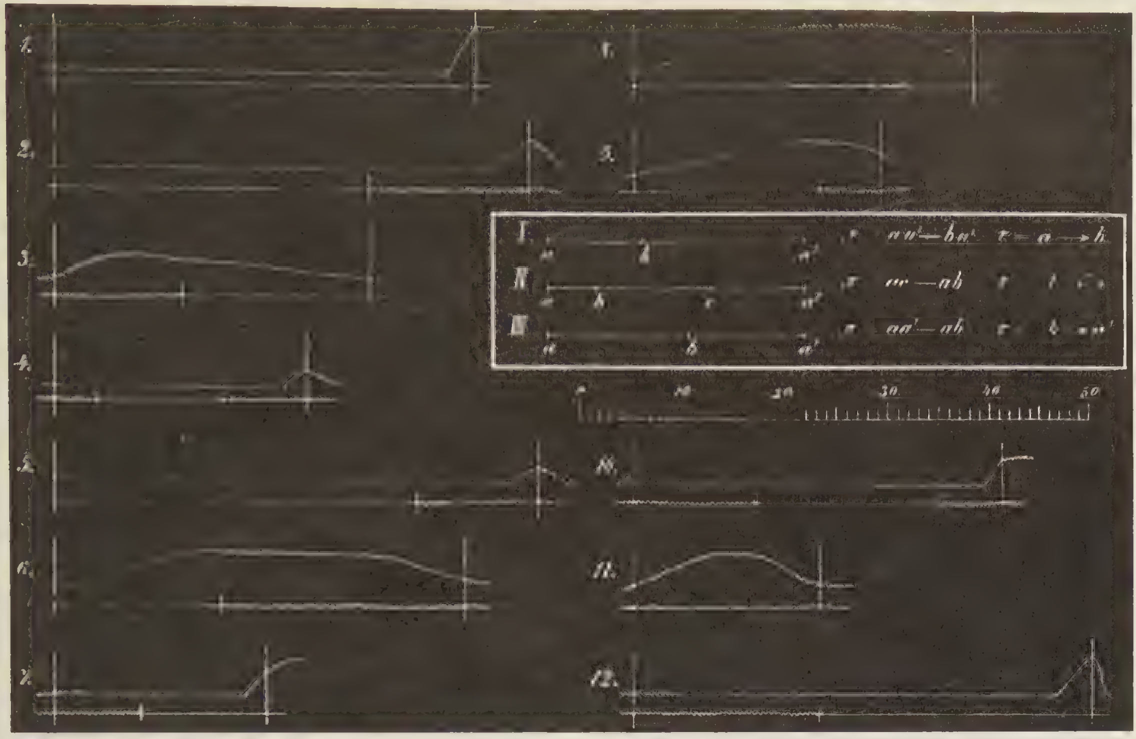


Figure 6. Phonoposoto- and phonotopometries (from Panconcelli-Calzia 1924: 42, © de Gruyter, Berlin. Reproduced with permission).

vowel [a] in the V-position and one of the consonants [p, f, t, s, k, ʃ] in the C-position he found that the stops were slightly shorter than the fricatives. In VCV items with the nasalized vowel [õ] and one voiced or voiceless consonant such as [v, f, d, t] in the intervocalic position the voiced consonants were a little shorter than the voiceless ones. In CVC, CVCVC, and CVCVCVC sequences the duration of the sound segments decreased as a function of the number of syllables. Rousselot could also show that a stressed syllable had longer segments than the same syllable without stress. And he also discovered that the last consonant in a word uttered in isolation is generally lengthened. This corresponds to the well-known fact that the duration of sound segments is normally increased at the end of an utterance, a fact which has been described in more detail by Binet, et al. (1894). Many of Rousselot's early observations have been confirmed and partly refined by later investigators.

Grégoire's investigation *Variations de durée de la syllabe française*, published in 1899, was the pioneering work for all following kymographic studies of duration. In his kymograms, he recorded both the airstream from the mouth and glottal vibrations from the larynx. His test items consisted of sequences of real French words such as *pâte:pâteuse:pâte* or *pâteuse:pâte:pâteuse* where the voiceless stop consonants facilitated the segmentation of the speech curves. Grégoire pointed to the fact that the intervocalic stops caused a silent interval between the vowels which was often nearly as long as the preceding vowel, and it should be mentioned that he tried to explain why this silent pause within the word is not actually noticed as an interruption of the word. Instead of formulating the rule, well known in the early 1990s, that short silent intervals of this sort are perceived as stop consonants, he argued that the motor activity of the speech organs goes on just as vigorously during the silent occlusion as before and after it, and thus unifies the auditory parts in the hearer by way of association. In addition, Grégoire again observed the lengthening of the final syllable of a word before a pause. In accordance with the CVC, CVCVC, and CVCVCVC observations of Rousselot mentioned above, Grégoire also discovered that the long syllable of a monosyllabic word becomes shorter and shorter when further syllables are added, as could be shown in the kymograms of the French words *pont*, *pontife*, *pontificat*, and *pontificalement*.

Grégoire's findings stimulated many other investigations concerning the law-governed variation of the duration of kymographic segments of sounds,

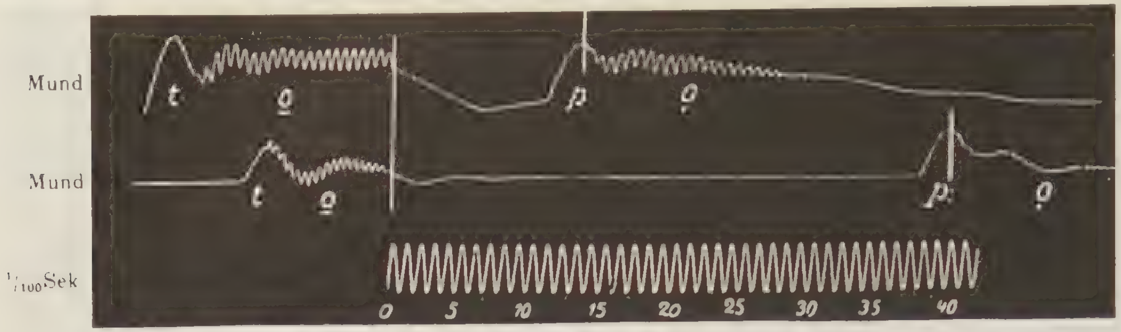


Figure 7. Kymograms of the mouth airstream curves of the Italian minimal pair *topo/toppo* (from Panconcelli-Calzia 1924: 115; © Walter de Gruyter, Berlin. Reproduced with permission)

syllables, and words. In particular, languages having phonological quantity contrasts attracted many investigators. Fig. 7 gives an example from Panconcelli-Calzia (1924: 115) who used this kymogram of mouth airstream curves to demonstrate the quantity differences in the Italian minimal word pair *topo/toppo*. The time reference at the bottom of Fig. 7 is a 100 Hz oscillation. The closure duration of the geminate p-stop in *toppo* is nearly 380 ms and is more than twice as long as the short stop in the contrasting word. But in the word *topo* the duration of the preceding vowel is much longer than in *toppo* as can be easily seen in the upper mouth airstream curve of Fig. 7.

E. A. Meyer devoted several extensive and carefully conducted studies to the duration of vowels and consonants in English (1903), German (1904), and Hungarian (1909). Besides many language-specific regularities which he was able to describe, he also discovered the so-called 'general law of vowel quantity,' which states that the duration of a vowel is correlated with its tongue height. This *Eigendauer* of vowels (intrinsic vowel duration, increasing from [i] and [u] to [a]), cannot be explained—as Jespersen had tried to propose—by the longer distance the tongue has to travel from the consonantal place of articulation to the vowel target. As Meyer could show, the characteristic intrinsic values of vowel duration do not disappear if the vowel is embedded between labial consonants. The same is true for vowels in word final position.

In another famous investigation, Menzerath & de Oleza (1928) drew and measured more than 7,800 sound segments in the kymographic recording of Spanish words read in citation form. The word material was organized first of all according to the number of syllables, words of 'Typ I' having one, of 'Typ VII' having seven syllables. The second criterion was the position of the stressed syllable, counted from left to right: thus a word of 'Sub-Typ V 3' consisted of five syllables and had lexical stress on its third syllable. The third criterion was the number of sounds in the word of a given subtype. The analysis of the detailed results, presented in 29 tables and 11 diagrams, led to the formulation of no less than 12 *general* and 50 *specific laws of quantity*. The systematic behavior of syllable durations can be seen from one of the original figures reproduced in Fig. 8. Here the mean duration of the syllables of the subtypes is represented by the diameter of a small circle, the circle of the stressed syllable being given a special mark. Stressed syllables always have a longer duration. Prepausal lengthening is clearly present in all 23 polysyllabic subtypes of words. The marked circles in the first column show the mean durations of all syllables in the given type of word. The duration of the syllables of a word decreases with the increase of the type number, as can be seen from Fig. 9 where the mean syllable duration of a word is presented as a function of Types I to VII.

In 1931, Weitkus published a similar extensive investigation based on the kymographic measurement of the duration of sounds and syllables in German sentences. He also considered the effects of different speaking rates. His final results are given in a concentrated list of 70 individual items. His work can be understood as a first step in the direction of the new 'phonometry' proposed by the Zwirners (see Sect. 3 below).

2.2 The First Crisis in Experimental Speech Research: Segmentation Problems and the Discovery of Co-articulation

Not all speech researchers analyzing kymograms were convinced that the given speech curves could be unambiguously segmented into single alphabetic units, according to the prevailing theoretical assumption that the utterances of speech acts consist of stable and steady segmental states and short and fast intersegmental transitions. A few critical researchers had decided to believe only in what a kymogram really showed itself, and ignored the interpretations of the skilled reader. Scripture (1902), for instance, was

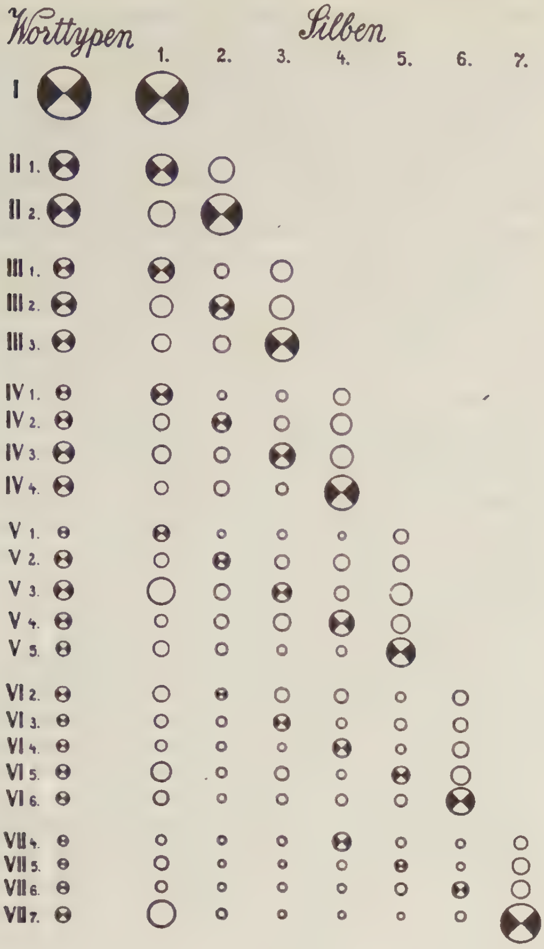


Figure 8. Syllable durations in Spanish words (from Menzerath & de Oleza 1928, Appendix Fig. V; © Walter de Gruyter, Berlin. Reproduced with permission).

clearly convinced that the most important result of experimental phonetics was the discovery that phonetic utterances had the form of the measured speech curves—thus for him all vowels were in reality 'more or less' of the nature of diphthongs, and alphabetically represented speech sounds existed only as a product of perception.

Another prominent researcher Panconcelli-Calzia, argued that sound segments or syllables had no phonetic reality at all. He called such units a pure fiction, an invention of linguists. He tried to prove this (1924: 23) by showing a pair of speech curves taken from the chest of a subject uttering the German word *Lokomotive*, first of all in a scanned version putting heavy stress on each individual syllable, and then in normal pronunciation: 'the syllable is only there if it is intentionally produced,' i.e., by means of extra chest pulses (see Fig. 10).

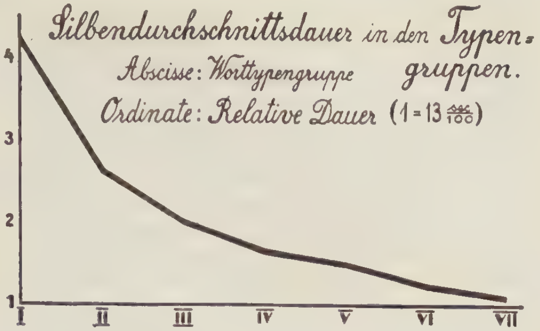


Figure 9. Mean duration of syllables in Spanish words as a function of numbers of syllables (from Menzerath & de Oleza 1928, Appendix Fig. VI; © Walter de Gruyter, Berlin. Reproduced with permission).

When in 1930 Gutzmann, at a meeting of the International Society of Experimental Phonetics in Bonn, showed the first cineradiographic film of running speech the audience was shocked, as Scripture reports:

> The impression of such a film is overwhelming. The organs of speech do not remain still for an instant, every speech act is the combination of the movements of all organs of the mouth, the throat, the larynx etc., and this combination is deployed over time. Sound positions simply do not exist. One understands at once that the sound physiology up to now has been based on an illusion and one awaits new explanations
>
> (1932: 173)

Here the crisis of modern speech research—the impossibility of mechanically identifying the sound units of an alphabetic speech transcription—became evident for the first time. The paradoxical situation was that instruments had been introduced to replace

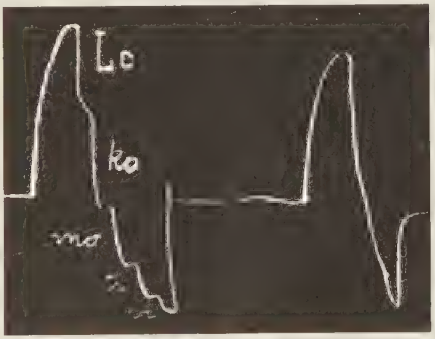


Figure 10. Chest kymograms of the German word 'Lokomotive' uttered in a scanned and a normal version (from Panconcelli-Calzia 1924: 23; © Walter de Gruyter, Berlin. Reproduced with permission).

subjective hearing by objective measurements, but the resulting picture did not show what was originally looked for: visible speech sounds. These had disappeared and had to be reinvented by the new phonologists (see *Prague School Phonology*).

A phonetic way out of the dilemma was proposed in 1933 by Menzerath & de Lacerda in their study *Koartikulation, Steuerung und Lautabgrenzung*. They used the kymographic method to show that speech sounds at the beginning of a syllable are coarticulated, i.e., produced at the same time, and that the vowel in a syllable rhyme is stopped ('controlled') by the following consonant if there is one. Menzerath & de Lacerda observed various coarticulatory phenomena; however, in modern terms, *Koartikulation* for them mainly seems to refer to the anticipation of consonantal and vocalic features in syllable initial position, whereas carry-over effects cannot easily be related to their concept of *Steuerung*. They formulated the theory that the complex combination of all simultaneous movements of the speech organs, which they called 'Synkinese,' existed only for the purpose of producing 'acoustically' a sequence of clearly separated and directly segmentable sound units. But in their new theory they failed to make any distinctions between purely acoustic sound segments in the physical world and the auditorily perceived sounds which again were taken as a common reality, an assumption that would later lead to a repetition of the first crisis.

3. Acoustic Nature of Speech Sounds

Before the mainstream of speech science, after the invention of a new kind of visible speech in the 1940s (see *Speech Technology: Historical Antecedents*), moved on to an extensive acoustic analysis of speech as well as to the early experiments concerning auditory speech perception, there already existed a solid foundation of phonetic knowledge about the acoustic nature of speech sounds (see also *Phonetics: Precursors to Modern Approaches*).

Brücke (1856) already had a good knowledge of the intrinsic pitch of vowels, and he clearly distinguished between the respective contributions of the vocal tract and the larynx to the acoustic formation of speech sounds. He repeated some of Willis's experiments (see *Speech Technology: Historical Antecedents*; *Phonetics: Precursors to Modern Approaches*) to demonstrate the separate effects of glottal phonation and the resonances in the vocal tract. Thus he could explain the audible effects when a female singer produces an [u]-vowel with a very high pitch. He also observed, by touching the Adam's apple with the tips of his fingers, that the length of the vocal tract varies with the tongue height of vowels.

The first person to look at specific pitch movements within the vowels of spoken and sung single words on the basis of measured fundamental frequency (F_o) values was Meyer (1897). He also described F_o-perturbations caused by the consonantal environment. Many detailed descriptions of variations in the F_o-contours can be found in the periodical *Vox* edited by Panconcelli-Calzia, especially in the years between 1911 and 1930. These include: the influence of a prevocalic breathy onset or of a glottal stop onset on the measured F_o-frequency; the syllabic F_o-contours of the tones of West African tone languages; the intonational F_o-contours of questions, commands, exclamations, requests, or neutral statements.

In his *Lehre von den Tonempfindungen*, first published in 1863, Helmholtz had introduced Fourier's harmonic analysis to explain vowel sounds in terms of complex tones. In 1861 Scott had invented the 'phonautograph' to register the vibration of a membrane in the form of an oscillogram. He referred to this as a direct way for the 'writing of sounds.' Paul Wendeler (1887) was one of the first to publish a comprehensive selection of speech oscillograms in his *Versuch, die Schallbewegung einiger Consonanten und anderer Geräusche mit dem Hensen'schen Sprachzeichner graphisch darzustellen*. Pipping (1890) improved Hensen's recording method, and presented the first manual computation of complete phase and amplitude spectra of sung vowels. In 1894 Hermann discovered the nonharmonic formant frequency which led to the long dispute between the Helmholtz/Stumpf and the Hermann/Scripture supporters, a conflict which was totally superfluous and unnecessary, as became known later. In the Z-transform X(z) of a digital speech signal x(n) the nonharmonic formant frequencies correspond to poles within the unit circle of the plane of the complex variable z, whereas harmonic components result, if the Z-transform is evaluated at integer multiples of the respective roots of unity directly on the unit circle itself. Stumpf published the results of his 'experimental phonetic investigations' in a book of more than 400 pages (1926). Most other pioneers of acoustic phonetics had analyzed recordings of a speaker who was asked to produce a certain speech sound. Stumpf conducted perception experiments and introduced his own 'analysis by synthesis' method to determine the acoustic properties of voiced and whispered vowels and consonants.

The relation between acoustic and articulatory speech data was discussed and analyzed very early by Lloyd (1890–99) in a series of articles entitled *Speech Sounds: Their Nature and Causation*. He criticized the fact that phoneticians either 'investigate speech on the side of sound' or 'on that of articulation' and argued 'that each is necessary to the other's completeness' (1890: 251). One of his aims was to explain 'why certain dissimilar articulations are found to produce very similar sounds, or why, conversely, certain small changes in articulation have a great effect upon the quality of sound' (p.252). Lloyd's questions are still of great interest in the 1990s.

On the basis of a statistical analysis of acoustically segmented and linguistically labeled speech data, the method of phonometry was proposed by E. & K. Zwirner (1936), as another way out of the lost speech sound dilemma described above in Sect. 2.2. They believed in the binomial distribution of the acoustic properties of sound segments, and assumed that the mean value of acoustically segmented and auditorily labeled parameters could represent the relevant norm historically given in a speech community (according to the theory of Hermann Paul concerning use and norms.)

4. Conclusion

The historical fact that the early inspection of speech sounds through direct perception, whether visual or aural or even tactile, was replaced by the inspection of graphically given speech curves led to a paradoxical situation. On the one hand it is true that more and more new properties of speech sounds were discovered, but on the other hand the linguist has to admit that certain fundamental theoretical concepts concerning the general nature of speech sounds, as well as the possibility of developing a systematic theory of speech sounds, had finally been lost. The ensuing bifurcation of the mainstream of classical speech science into instrumental and experimental phonetics on the natural science side, and phonology and theories of sound systems of individual languages on the linguistic side, as well as the eventual reunification of the two separated streams into the speech science of the late twentieth century is outside the scope of this article.

Bibliography

Abercrombie D 1965 What is a 'Letter'? In: Abercrombie D *Studies in Phonetics & Linguistics*. Oxford University Press, London

Atkinson H W 1899 Methods of mouth-mapping. *Die Neueren Sprachen* **6**: 494–503

Bell A M 1863 *The Principles of Speech and Vocal Physiology: and Dictionary of Sounds*. Hamilton & Adams, London

Bell A M 1867 *Visible Speech: Universal Alphabetics or Self-interpreting Physiological Letters for the Writing of All Languages in One Alphabet*. Simpkin & Marshall, London/Trübner, New York

Binet A, Phillippe M, Courtier M, Henri V 1894 *Introduction à la psychologie expérimentale*. Alcan, Paris

Brücke E W von 1849 Untersuchungen über die Lautbildung und das natürliche System der Sprache. *Sitzungsberichte der königl. Akad. Der Wissenschaften. Math.-nat. Cl.* II: 182–208 Vienna

Brücke E W von 1856 *Grundzüge der Physiologie und Systematik der Sprachlaute für Linguisten und Taubstummenlehrer*. Gerold, Vienna

Champollion J F 1822 *Lettre à M. Dacier relative à l'alphabet des hiéroglyphes phonétiques employés par les Égyptiens etc*. Didot, Paris

Coles J O 1872 A Plan for ascertaining more accurately the physiology of speech. *Transactions of the Odontological Society of Great Britain* **4**: 110–23

Darwin E 1803 *The Temple of Nature; or The Origin of Society*. Johnson, London

Dudley H, Tarnoczy T H 1950 The speaking machine of Wolfgang von Kempelen. *Journal of the Acoustical Society of America* **22**: 151–66

Ellis A J 1848 *Essentials of Phonetics*. Pitman, London

Grandgent C H 1890 Vowel measurements. *Publ. Mod. Lang. Assoc*. **5**: 148–74

Grandgent C H 1892 *German and English Sounds*. Ginn, Boston

Grégoire A 1899 Variations de durée de la syllabe française. *La Parole* **1**: 161

Grimm J 1822 2. Aufl. 1840 3. Aufl. *Deutsche Grammatik*. Dieterich, Göttingen

Grützner P 1879 Physiologie der Stimme und Sprache. In: *Hermanns Handbuch der Physiologie*. Band I. Teil II Vogel, Leipzig

Gutzmann H 1930 Röntgenfilmaufnahmen des Sprechens. In: Menzerath, P (ed.) *Bericht über die 1. Tagung der Internationalen Gesellschaft für experimentelle Phonetik in Bonn vom 10. bis 14. Juni 1930*. Bonn

Helmholtz H 1863 *Die Lehre von den Tonempfindungen*. Vieweg, Braunschweig

Hermann L 1890 Phonophotographische Untersuchungen III. *Pflügers Archiv für die gesamte Physiologie* **47**: 347–91

Jespersen O 1889 *Articulations of Speech Sounds Represented by Means of Analphabetic Symbols*. Elwert, Marburg

Jespersen O 1904 *Lehrbuch der Phonetik*. Teubner, Leipzig

Kaiser L 1934 Some properties of speech muscles and the influence thereof on language. *Archives Néerlandaises de Phonétique Expérimentale* **10**: 121–33

Kaiser L 1943 *Biological and Statistical Research Concerning the Speech of 216 Dutch Students*. Noord-Hollandsche Uitg. Mij. (Repr. from *Archives Néerlandaises de Phonétique Expérimentale* 15–19)

Kempelen W von 1791 *Mechanismus der menschlichen Sprache nebst der Beschreibung seiner sprechenden Maschine*. Degen, Vienna (1970: Faksimile-Nachdruck, mit einer Einleitung von H E Brekle und W Wildgen. Frommann-Holzboog, Stuttgart-Bad Cannstatt)

Kingsley N W 1880 *A Treatise on Oral Deformities*. Appleton, New York

Kingsley N W 1887 Illustrations of the articulations of the tongue. *Internationale Zeitschrift für allgemeine Sprachwissenschaft* **3**: 25

Lenz R 1888 Zur Physiologie und Geschichte der Palatalen. *Zeitschrift für vergleichende Sprachforschung* **29**: 1–59

Lloyd R J 1890 Speech sounds: Their nature and causation. Teil I. *Phonetische Studien* **3**: 251–79

Marey E J 1878/1885 *La méthode graphique dans les sciences expérimentales* (2me tirage avec supplément). Masson, Paris

Menzerath P 1942 Gedanken über Kern-und Wendepankte in der Phonetik. *Arch. für vergl. Phonetik* **6**: 89–102

Menzerath P, de Oleza J M 1928 *Spanische Lautdauer: Eine experimentalphonetische Untersuchung*. De Gruyter, Berlin

Menzerath P, de Lacerda A 1933 *Koartikulation, Steuerung und Lautabgrenzung*. Dümmler, Berlin

Merkel C L 1857 *Anatomie und Physiologie des menschlichen Stimm- und Sprach-Organs (Anthropophonik)*. Abel, Leipzig

Meyer E A 1897 Zur Tonbewegung des Vokals im gesprochenen und gesungenen Einzelwort. *Die neueren Sprachen* **4**: 1–21

Meyer E A 1898 Beiträge zur deutschen Metrik. *Die neueren Sprachen* **6**: 1–37, 122–40 (Marburg Diss. 1897)

Meyer E A 1898–99 Die Silbe. *Die neueren Sprachen* **6**: 479 93

Meyer E A 1903 *Englische Lautdauer*. Harrassowitz (Leipzig), Uppsala

Meyer E A 1904 Zur Vokaldauer im Deutschen. In: *Nordiska Studier tillegnade Adolf Noreen*, Appelberg, Uppsala

Meyer E A 1907 Röntgenographische Lautbilder. *Monatschrift medizin-pädagog. f. d. gesamte Sprachheilkunde* **17**: 225–43

Meyer E A 1910 Untersuchungen über Lautbildung. In: *Festschrift Wilhelm Viëtor*. Elwert, Marburg

Meyer E A, Gombocz Z 1911 *Zur Phonetik der ungarischen Sprache*. Edv. Berlings Buchdruckerei, Uppsala

Panconcelli-Calzia G 1919 Die Phonoposoto- und Phonotopometrie. *Vox* **29**: 18–26

Panconcelli-Calzia G 1924 *Die experimentelle Phonetik in ihrer Anwendung auf die Sprachwissenschaft*. De Gruyter, Berlin

Pipping H 1890 *Om klangfärgen hos sjungna vokaler*. Frenckell & Son, Helsingfors

Rousselot P J 1891a Les modifications phonétiques du langage. *Revue des patois gallo–romans* **4**: 65–208

Rousselot P J 1891b La méthode graphique appliquée à la recherche des transformations inconscientes du langage. *Revue des patois gallo–romans* **4**: 209–13

Rousselot P J 1897–1908 *Principes de phonétique expérimentale*. 2 vols. Welter, Paris

Scott (de Martinville) E L 1861 *Inscription automatique des sons de l'air au moyen d'une oreille artificielle*.

Scripture E W 1902 *The Elements of Experimental Phonetics*. Scribner's Sons, New York/Arnold, London

Scripture E W 1932 Referate. *Zeitschrift für Experimental-Phonetik* **1(3/4)**: 171–88

Sievers E 1876 1. Aufl. *Grundzüge der Lautphysiologie*. 1893 4. Aufl. *Grundzüge der Phonetik*. Breitkopf & Härtel, Leipzig

Stumpf C 1926 *Die Sprachlaute. Experimentell-phonetische Untersuchungen*. Springer, Berlin

Techmer F 1880 *Zur vergleichenden Physiologie der Stimme und Sprache. Phonetik*. Engelmann, Leipzig

Techmer F 1884 Naturwissenschaftliche Analyse und Synthese der hörbaren Sprache. *Internationale Zeitschrift für allgemeine Sprachwissenschaft* **1**: 69–170

Wagner P 1891 Über die Verwendung des Grützner–Marey'schen Apparates und des Phonographen zu phonetischen Untersuchungen. *Phonetische Studien* **4**: 69–83

Wallis J 1653 *Grammatica Linguae Anglicanae, cui praefigitur, De loquela, sive de sonorum omnium loquelarium formatione, tractatus grammatico-physicus*. Lichfield, Oxford

Weitkus K L 1931 *Experimentelle Untersuchung der Laut- und Silbendauer im deutschen Satz*. (Phil. Diss.) Neuendorff, Bonn

Wendeler P 1887 Ein Versuch die Schallbewegung einiger Konsonanten und anderer Geräusche mit dem Hensen'schen Sprachzeichener graphisch darzustellen. *Zeitschrift für Biologie* **23**: 303–20

Willis R 1830 On vowel sounds, and on reed organ pipes. *Transactions of the Cambridge Philosophical Society* **3**: 231–76

Wolf O 1871 *Sprache und Ohr*. Vieweg, Braunschweig

Zoega G 1797 *De origine et usu obeliscorum*. Rome

Zwaardemaker H 1927 L'analogue graphique de l'écriture analphabétique par signes de Jespersen en phonétique. *Archives Néerlandaises de Phonétique Expérimentale* **1**: 49–85

Zwirner E, Zwirner K 1936 *Grundfragen der Phonometrie*. Metten, Berlin (Transl. by Bluhme H 1970 as *Principles of Phonometrics*, University of Alabama Press)

Speech Technology: Historical Antecedents

John J. Ohala

In a broad sense, 'speech technology' should refer to any innovation which serves to amplify or facilitate communication based on speech. This would include the phonological devices used in oral poetry (rhyme, assonance, alliteration, meter), all of which make oral compositions more memorable; the invention of writing, printing from movable type, the telegraph, radio, the telephone, the gramophone (and other means of audio recording), the artificial larynx, and the hearing aid; and synthetic speech and automatic speech recognition. This article concentrates on the early history of speech synthesis primarily, but also of automatic speech recognition.

Typically, a technological development must be preceded by a perceived need and an analytical understanding of the problem domain. Evidence of the felt need to communicate via speech and language with animals or objects can be found in the folklore of all cultures, for example, Ali Baba in the story of *The 40 Thieves* in *The Arabian Nights*, who could control the cave door with the command 'Open Sesame.' As for the analytical understanding of speech, at least in the domain of speech production, this was evident in the teachings of the early Sanskrit grammarians, the East Asian and the Arab and Persian phonetic tradition, and also the western phonetic tradition by the seventeenth century. Nevertheless, only from the late eighteenth century onward is there firm evidence of authentic speech synthesis (see *Phonetics: Precursors to Modern Approaches*; *Early Modern Instrumental Phonetics*).

1. Speech Synthesis

Talking statues or talking heads are reported from ancient times. John Wilkins (1614–72), in his *Mathematical Magick* (1648), and Sir David Brewster (1781–1868), in his *Letters on Natural Magic* (1832), repeat the stories that Albertus Magnus (ca.1193–1280) and Roger Bacon (ca.1214–ca.1292), among others, constructed talking heads. Some of these cases undoubtedly involved fraud: Lucian, the second-century AD Greek satirist, reports one such deception where a speaking tube made from the trachea of a crane was used to convey a concealed human speaker's voice to the mouth of a statue. Other cases were probably nothing more than ventriloquism, that is, where a human speaker creates the illusion that a voice emanates from another location. Insufficient documentation survives to show for certain whether any cases were legitimate manifestations of synthetic speech. Wilkins thought that some of them were genuine, and mentions what are even in the late twentieth century recognized as the two principal approaches to speech synthesis: duplicating the action of the speaking organs (articulatory synthesis), and creating sounds which imitate those of speech (acoustic synthesis).

In the late eighteenth century, several individuals seem to have been working largely independently on making artificial speech. Christian Gottlieb Kratzenstein of Copenhagen was the first, in 1781, to publish his work, which was the winning essay in a competition set by the St Petersburg Academy of Sciences to specify the character and means of production of the five [*sic*] vowels. Although he did not have a clear idea of resonance, what he created were five oddly shaped resonators which, when excited by a vibrating reed, made distinctly different sounds which listeners could associate with the five intended vowels. In 1791, Wolfgang von Kempelen published his well-researched and influential book *Mechanismus der menschlichen Sprache*, in which he summarized existing knowledge on the nature and production of speech, supplemented by his own original contributions, and gave such detailed plans for the construction of a speaking machine that twentieth-century speech researchers have been able to follow and implement them. At the same time, he demonstrated his speaking machine all over Europe. His approach to synthesis was a hybrid one: it primarily consisted of articulatory synthesis, employing mechanical analogues of the lungs (bellows), vocal folds (reed), nasal branch, and oral cavity, but relied on acoustic synthesis for the fricatives, which were produced by allowing air to pass through short tubes whose hissing sound was not channeled through the oral cavity. The hand of the person operating the machine was a crucial part of the synthesizer: certain vowels and oral consonants were produced by covering or filling the oral resonating cavity in ways discovered by trial and error.

Sir Charles Wheatstone (1802–75) built a speech synthesizer following von Kempelen's plans, and demonstrated it before a scientific gathering in 1835. Years later, he also demonstrated it to the young Alexander Graham Bell.

Erasmus Darwin (1731–1802), grandfather of Charles Darwin, in his posthumously published *The Temple of Nature* (1803), gave an account of a synthesizer similar to von Kempelen's but much simpler in that it was capable of producing only labial sounds and the vowel [a]. His work is significant because of his comment that such a machine, suitably elaborated, and 'if built in a gigantic form, might speak so loud as to command an army or instruct a crowd.' This would never have worked, of course, because scaling up the dimensions of the device would also have caused an inverse scaling of the formant frequencies, probably to the point of rendering the speech unintelligible. Still, this was an innovative proposal for an application of speech synthesis.

Robert Willis (1800–75), a Cambridge engineer, in his article 'On the vowel sounds' (*Transactions of the Cambridge Philosophical Society* 1830), demonstrated that acceptable vowels could be synthesized quite simply by acoustically exciting a uniform tube of varying length, the sound [u] requiring a long tube, [ɑ] intermediate, and [i] the shortest tube, with all other vowels being points on this vowel continuum. He was the first to treat quantitatively the characteristic resonant frequencies of vowels. His single-resonance theory of vowels resembles the late twentieth-century notion that there is a 'characteristic' formant frequency for each vowel and that this corresponds to a weighted average of closely spaced formants: F2 and F3 for front vowels, and F2 and F1 for low and back vowels.

Hermann Ludwig Ferdinand von Helmholtz (1821–94), the Prussian polymath, discovered multiple resonances for most of the German vowels by analyzing them with tuning forks and what have become known as Helmholtz resonators. He then synthesized these vowels by combining the output of separate tuning forks having the appropriate frequencies. A schematic representation of his apparatus is shown in Fig. 1. Although this apparatus was only capable of synthesizing steady-state vowels, it represented the first purely acoustic-domain synthesis and, moreover, demonstrated how these acoustic constituents of speech could be controled and transmitted via an electrical current. This work, published in 1859 and 1863 (*Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik*), was very influ-

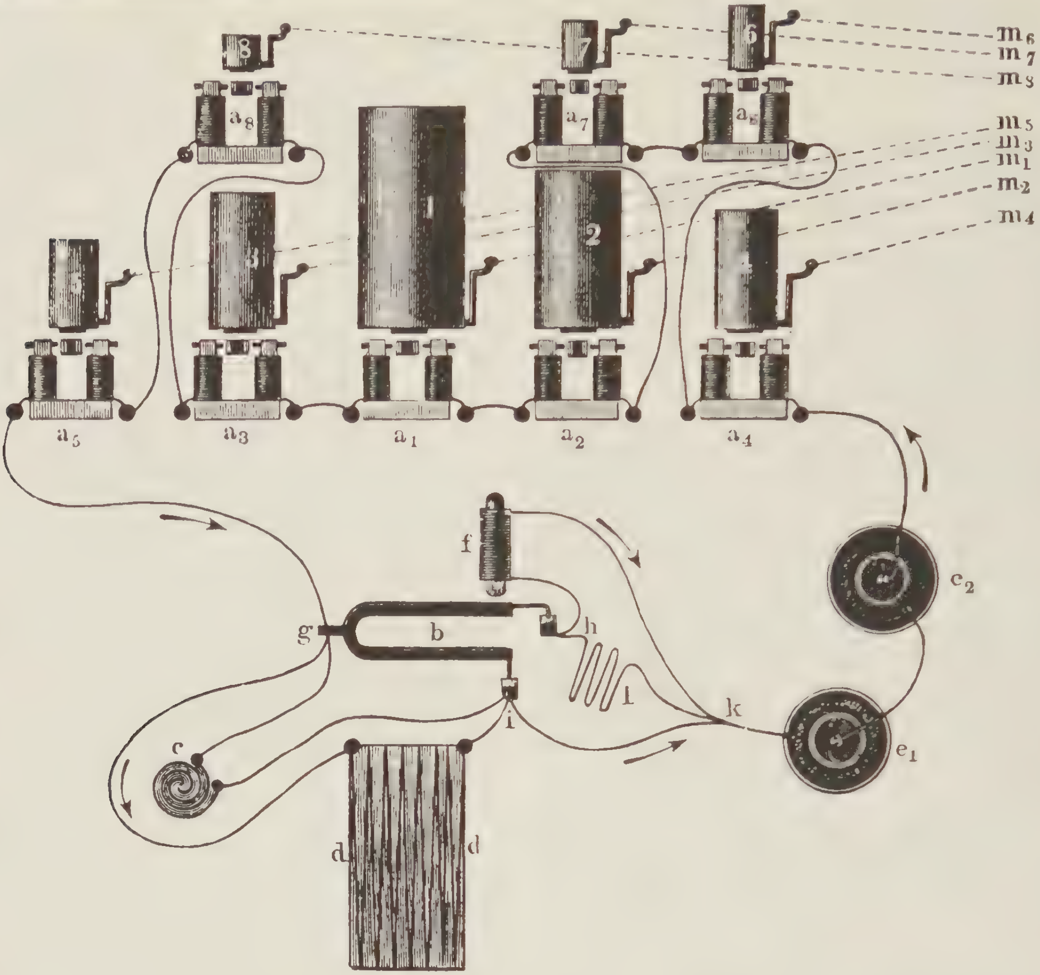


Figure 1. Helmholtz's mechanism for synthesizing steady-state vowels: e_1 and e_2: batteries; *aa*, *l*: resistances; *c*: condenser; *b* and *f*: tuning fork and the electromagnet which drives it; *h* and *i*: cups of mercury; prongs *h* and *i* attached to the ends of the tuning fork *b* such that at rest they lie just above the surface of the mercury; $a_1 \dots a_8$ and 1 . . . 8: secondary electromagnets plus tuning forks (viewed on end) and resonance chambers (Helmholtz resonators); $m_1 \dots m_8$: levers operated by threads to regulate the position of covers on the resonators. Electromagnet *f* sets tuning forks *b* into vibration causing the current to be intermittently interrupted as the prongs dip into and out of the mercury. When the current is interrupted at *h* or *i* a current is induced in the secondary electromagnets and sets the secondary tuning forks into in-phase vibration; selected resonators are excited by these tuning forks by pulling on the levers. The composite sounds recreate the multiple resonances of vowel sounds.

ential and had far-reaching repercussions in speech technology.

The subsequent history of speech synthesis was largely one of refining the details of the acoustic structure of speech and implementing Helmholtz's work using, first, electrical circuits instead of tuning forks and, ultimately, digital methods. (In this history, the Haskins Laboratory's 'pattern playback' was unique in employing a graphical–optical element in their synthesis.) Synthesis also developed from steady-state speech sounds to fully dynamic speech, and from synthesis-by-art to fully automatic synthesis from phoneme or ordinary text input.

2. Speech Recognition

Helmholtz's work in decomposing and recomposing speech into its relevant acoustic parts was known to Elisha Gray (1835–1901), rival of Alexander Graham

Bell in the race to patent the telephone, and was the basis for his idea (never implemented) to transmit the voice by first separating out the different component frequencies, transmitting these frequencies over wires and then resynthesizing the voice by combining the frequencies at the receiving end. Conceptually, this is the idea behind the twentieth-century device, the vocoder, which, in turn, was the conceptual basis of the first successful automatic speech recognition devices in the early 1950s.

Prior to the 1950s, there were various notable attempts to improve speech recognition using machines; though these did not involve fully automatic recognition, they were 'learning experiences' for the field. After World War II, researchers at Bell Telephone Laboratories tried to teach both normally hearing and hearing-impaired subjects to recognize speech coded visually using a real-time spectrograph. Although the attempt was not very successful (in the sense that an inordinate amount of training had a disappointingly small payoff), this led to several papers and a book (Potter et al. 1947), in which the acoustic cues of different speech sounds were given in great detail.

In the late 1940s Jean Dreyfus-Graf, a Swiss engineer, demonstrated a device that he called the 'sonograph' (not to be confused with the 'Sonagraph,' a trade name of one of the early versions of the sound spectrograph), which put the speech signal through some six different frequency bands and then used the rectified, integrated outputs to drive a graphical device which produced a cursive, seemingly stenographic representation of speech. The inventor suggested that with further elaboration this could be converted to a phonetic typewriter where each spoken sound could ultimately be identified automatically and drive a phonetic typewriter. Such further development never succeeded, and it was at about this time that automatic speech recognition using whole-word spectral patterns was demonstrated.

The subsequent history of these two approaches to automatic speech recognition, based on the detection of whole-word (or phrase) spectral patterns versus the subparts of words (phones, phonemes, syllables, or parts of syllables), is still ongoing in the 1990s.

Bibliography

Bouman H D, Kucharski P 1929 Synthèses de voyelles à moyen de deux sons simples. *Archives Néerlandaises de Phonétique Experimentale* **4**: 90–111

Davis K H, Biddulph R, Balashek S 1952 Automatic recognition of spoken digits. *Journal of the Acoustical Society of America* **24**: 637–42

Dreyfus-Graf J 1950 Sonograph and sound mechanics. *Journal of the Acoustical Society of America* **22**: 731–39

Dudley H, Balashek S 1958 Automatic recognition of phonetic patterns in speech. *Journal of the Acoustical Society of America* **30**: 721

Dudley H, Tarnoczy T H 1950 The speaking machine of Wolfgang von Kempelen. *Journal of the Acoustical Society of America* **22**: 151–66

Potter R K, Kopp G A, Green H C 1947 *Visible Speech*. Van Nostrand, New York

History of Translation

Louis G. Kelly

From Roman times to the present, Europe has been a civilization of translations, every aspect of its culture, literature, administration, trade, religion, and science having been deeply influenced by translators. Modern thought on translation derives ultimately from the Jews of Alexandria in the first century BC who translated literally, and the Romans of the Classical Age, who did just the opposite. Two short passages have had an inordinate influence on translation theory: *De optimo genere oratorum* (v. 14) by Marcus Tullius Cicero (106–43 BC), which insisted on the necessity of 'weighing' words rather than 'counting them,' and the famous condemnation of literal translation by the poet Horace (65–8 BC) in his *Ars poetica* 131–35 (ca.19 BC).

1. The Classical Period

1.1 Jewish Translation

Translation was a constant of ancient civilizations—there are bilingual inscriptions from Assyria and Mesopotamia (3000 BC) and the Rosetta stone from Egypt (196 BC). Most of these translations dealt with administrative and commercial matters. The Jewish translators of the Old Testament were based in Alexandria, then one of the most important Greek-speaking cities in the Mediterranean. By 200 BC they were facing a dilemma. On the one hand most Jews living outside Palestine could not understand Hebrew well enough to read the Scriptures. On the other, translation of the Scriptures was tampering with the

Word of God. Both Jewish theology and Neoplatonist philosophy agreed that the Divine Word illuminated the human soul and mind, and that names directly reflected natures. One could only avoid negating the creative power of the Scriptures by strict word-for-word translation. The Greek version of the Hebrew Scriptures, the *Septuagint*, was complete by about 150 BC. The persistent legend that the 70 translators were left in solitary confinement each with a Hebrew text and in 70 days each produced identical texts shows that literal translation was accorded mystical value.

1.2 Roman Translation

In ancient Rome, translation was always done from Greek texts normally as a rhetorical or creative task. Roman thought on the craft was summed up by the first-century rhetorician, Quintilian, who repeated the ideas of Cicero and Horace, seeing translation as 'rivalry' of the original author. The one dissenting voice was the philosopher, Seneca the Younger, who demanded that if truth was to be kept, translation should be strictly literal.

In about 250 BC, Livius Andronicus, a Greek slave captured at Tarentum in southern Italy in 272 BC, produced a Latin version of the *Odyssey*, which was still being used as a textbook in Roman schools a couple of centuries later. In the meantime soldiers and other administrators were coming back to Rome with a taste for Greek amusements, particularly theater. Enterprising writers supplied the need by free translation and even adaptation from Greek dramatists. The two most famous of these Roman dramatists of the generation after Livius Andronicus, Plautus (d.184 BC) and Terence (190–159 BC), were regarded as authorities on translation until the end of the western Roman Empire.

The greatest age of Roman literary translation lasted from the first century BC to the middle of the first century AD. The Roman Golden Age set the custom, which lasted until well into the twentieth century, of treating translation as a literary apprenticeship and constant exercise. Most of the extant poets have some translation in their corpus; for example, Cicero's major contribution was to create scientific terminology through his versions of Greek philosophy. Translation remained common in the centuries following, one notable translator being the philosopher Apuleius (120–155), the author of *The Golden Ass*.

The importance of literary translation has obscured the immense amount of Roman technical and scientific translation. There was a small corpus of medical translators whose adherence to the originals by Hippocrates, Galen, and some minor Greek medical writers is typical of technical work in all ages. Drawing on the talent at his disposal the Emperor Augustus set up a translation office as part of the imperial household to assist in administering the Empire. Its most prominent piece of work is the *Monumentum ancyranum*, Emperor Augustus's own statement of his achievements, translated as a blatant piece of propaganda. This translation office remained active until after the fall of Rome in the fifth century.

1.3 Christian Translation

Christian translation, from Greek into Latin (except for Ulfila's fourth-century Gothic version of the Bible) began in the second century AD with the *Shepherd of Hermas* and parts of the Bible. The Jewish Platonist ideas on the relationship between language and the divine flourished in their assiduously literal style. Translation of Greek Christian liturgies for Latin-speakers began soon after. The Christian tradition culminated in the work of St Jerome (348–420), famous for his Latin version of the Bible, the Vulgate (383–406), and for a huge number of miscellaneous translations covering Church administration, monastic rules, and theology. However, he was only one of a very skilled band of translators, which included his former friend, Rufinus (345–410), the philosopher, Marius Mercator (ca.400–450), and a large number of anonymous churchmen.

Roman translation came to an end with Boethius (480–524). He had meant to stave off the tide of barbarism attendant on the collapse of the Roman Empire by producing Latin versions of the complete corpus of Plato and Aristotle, but was executed for treason in 524 with only a small part of the work done. His versions revert to the strict type of translation thought proper by Biblical translators. His preface to Porphyry's *Isagoge*, which castigates elegance as inimical to 'truth,' may owe as much to Seneca as to the Judeo–Christian tradition.

2. The Middle Ages

2.1 Translation from Greek to Latin

Although Jerome was revered and quoted right through the Middle Ages and the Renaissance as the main model for translation, the medieval tone was set by Boethius. His methods were followed by Cassiodorus (ca.490–583). Between 550 and 560 Cassiodorus assembled a stable of translators in a monastery in Calabria called the Vivarium, dedicated to preserving Classical culture. He, like Boethius, had the ambition to translate the whole of Greek philosophy and theology into Latin. Though he did not succeed in this aim, he put translation on a sound administrative footing which kept cultural lines open with the Greek East. From the sixth until the sixteenth century there was a flourishing traffic of religious translations between East and West.

Among the most significant translation centers were the schools of the Muslim world at Baghdad, Seville, Toledo, and Cordova, where Greek philosophy and science were translated into Arabic. From the tenth to the early twelfth centuries these centers, in particular Toledo, played host to a number of Christian philosophers who translated Arab texts into Latin and brought back to the West Greek texts that had been lost. Another important center for this work was the Kingdom of the Two Sicilies where scientific, diplomatic, and religious translators worked between Latin, Arab, and Greek. But even there can be found flashes of the ancient rhetorical theories of translation. Henricus Aristippus, Archdeacon of Catania (ca.1100–70), supported illuminist arguments for literal translation by quoting Horace's *Ars poetica* 361–62, which compares poetry to a picture that is different according to the angle from which you view it. Between the ninth and sixteenth centuries there were Latin communities in Constantinople and Greek ones in the West which kept up a steady flow of translation between Latin and Greek in an effort to heal the breach between Eastern and Western Christianity.

The thirteenth-century controversy at the University of Paris over translating Greek philosophers from Arabic versions caused a fierce discussion of translation. Roger Bacon, arguing from lexical and terminological evidence, condemned it out of hand in his *Opus tertium*, while other philosophers, notably Thomas Aquinas, speculated on the nature of translation, seeing it almost as a barter transaction in which fair value must be paid. Following attempts to condemn Aristotle as corrupt and corrupting, his works were retranslated from the Greek texts to rid them of Arab accretions. The greatest of these translators were William of Moerbeke (1215–86), a Dominican friar, and Robert Grosseteste (1168–1253), Bishop of Lincoln.

2.2 Towards the Vernaculars

St Cyril and St Methodius (early ninth century) Christianized the Slavs and translated the Greek liturgy and Bible into Slavonic. In England the first Bible translation was the verse rendering of Caedmon (seventh century). A century and a half later, Alfred the Great (848–99) ordered Pope Gregory the Great's *Pastoral Care* and other important ecclesiastical documents to be translated into Anglo–Saxon to counteract a certain laxness in the English church. In Germany, the English missionary, St Boniface (673–754), produced one of the early versions of the Scriptures. During the eighth century there was much legal translation between the vernaculars and Latin, as new codes were evolved from Roman Law.

After the Christian conquest of Spain, the kings, particularly Alfonso el Sabio, commissioned technical translations from Arab and Latin into the vernacular. By the fourteenth century there existed a full corpus of medical works in Spanish and Catalan. In France, Charles V founded a similar cultural center in his court. His translators included men of letters, administrators, and scientists. The most important was Nicole Oresme (1320–82), reputed to be the first to translate Aristotle into a vernacular language. London too was an important center of royal patronage, and gained dramatically in importance after William Caxton (1422–91), a skilled translator, set up his printing press.

Literary translation into vernacular languages, either from Latin or from other vernaculars, begins around the tenth century. The first translations of Classical rhetoric date from this period—vernacular writers saw such translation in the same light as Livius Andronicus had seen it twelve hundred years before: it was a way of bringing the language to maturity. For the general public there were versions of Ovid and Virgil, very often taken from medieval Latin reworkings. Epic poetry, like the *Chanson de Roland*, was also translated widely, so that most of this great medieval epic exists in a large number of dialects and languages. Much of the really important translation was in the hands of the troubadours, who translated very freely between the vernacular languages, often extempore and as part of a performance.

The laity benefited from translation of popular devotional books, much of it anonymous. Boethius's *Consolation of Philosophy* was very popular, and was normally taken from a French version, for example, Chaucer's translation. Many countries produced versions of the Epistles and Gospels used at Mass, and it seems that these were often read while the celebrant read the Latin.

Where a technical translation remains very close to its original, literary translation is extremely free. The first attempts to apply linguistics to translation seem to be the orthodox attacks on the fourteenth-century Lollard Bibles: the claim is that translation from Latin to the vernaculars is impossible because of lack of formal identity between language resources. The Lollard reply turns on functional arguments—if one can do the same or similar things in English (i.e., construct sentences, show the line of argument) one does not need formal identity.

3. Renaissance and Humanism

3.1 Philosophy and Science

As the Turks were increasing the pressure on the Byzantine Empire in the fourteenth century, Greek scholars began moving west. Once established they made their living by setting up schools. Major schools were set up at Florence and Venice, both powerful trading republics with ruling families interested in scholarship, by Manuel Chrysoloras (1355–1415) and Constantine Lascaris (1439–1501), who soon distinguished themselves as translators from Greek into Latin, and put translation at the center of the educated person's skills. Among their pupils were Marsilio Ficino (1433–99), who translated Plato into Latin, and

Aeneas Silvius Piccolomini (1405–64), later Pope Pius II. In these schools translation reverted to the manner and principles of the Classical rhetoricians, and thus dethroned the translation model of Boethius. An early pupil of the Florentine schools, Leonardo Bruni Aretino (1369–1444), translated Aristotle into Latin (ca.1420) and wrote a rather pugnacious preface on the necessity of translating works in a style consonant with their elegance.

Because the basic training of a scientist was Classical and philological, noted translators like Thomas Linacre (1465–1524), Professor of Medicine at Oxford, and Janus Cornarius (1500–88), first Dean of Medicine at Jena, scoured European libraries for Greek medical and scientific manuscripts, edited them, and translated them into Latin. By 1600 practically every important Greek work on science and philosophy had its humanist Latin version for use in the medical schools, and in many cases a vernacular version as well. Alongside these were translations from texts on alchemy, both works ascribed to the thirteenth-century scholastics like Roger Bacon and Albert the Great, and books by later alchemists like Basil Valentine and Nicholas of Cusa. Contemporary alchemists like Paracelsus (1493–1541) who wrote in their own languages (in the case of Paracelsus, German), were translated into Latin, and then from there into the local vernaculars. Gerhard Dorn (fl.1570–90) was the most prominent Latin translator of alchemy.

3.2 *Religion*

Sixteenth-century humanism was essentially religious, and translators were essential to Reformation and Counter-Reformation. They treated religious material no differently from other writings, assessing the worth of manuscripts, interpreting readings against parallel texts, etc. Translators first sought to produce Latin Bibles of humanist standard; and there were a large number of them. The most influential was the Greek–Latin New Testament (1523) of Desiderius Erasmus (1466?–1536), the *textus receptus*, which studiously tried to be doctrinally neutral. But other Latin translators like Théodore de Bèze (1519–1605) and Sebastian Castalio (1515–63) produced Bibles in fairly Classical Latin, but with strong doctrinal leanings.

Of the vernacular Bibles, Luther's (1534) is preeminent. Other German versions were produced by reformers in Switzerland. Luther influenced the Dutch version of 1537, the Swedish of 1541, and the Danish of 1550. Other important Protestant Bibles were the 1641 Italian version by the Calvinist, Giovanni Diodati (1576–1649), which he himself turned into French in 1644, and the French Bibles of Jacques Lefèvre d'Etaples (1455–1537), Pierre Olivétan (d.1538), and Théodore de Bèze's 'Geneva Bible' which came out in 1528, 1535, and 1556, respectively. In Spain the first complete version of Scripture was published in 1569 by Cassiodoro de Reina (1520–94), a follower of Jean Calvin; and in Italy the first complete Bible was by Antonio Brucioli (ca.1495–1566) in 1532. In England there was a long progression from the Tyndale Bible of 1526–30 to the Authorized Version of 1611, which is an excellent example of teamwork. The work was divided between six 'companies,' which included theologians as well as experts in Classical languages.

Catholic countries tended to lag in Biblical translation. Spain continued the medieval custom of translating the Epistles and Gospels used at Mass. France often readapted Protestant or doubtful Bibles; for example, the Catholic *Bible de Louvain* (1550) was Lefevre d'Etaples's edition brought up to date. Likewise in Germany: Hieronymus Emser's version (1523) tried to 'correct' those parts of Luther's Bible already circulating. In 1548 Nicolaus van Winghe produced a Dutch Catholic Bible which remained standard until 1926. In England the Douay–Rheims version, translated from the Vulgate, appeared in 1588 as an emergency measure to counter Protestant accusations, partially justified, that the Catholics were afraid of the Bible. Most of the Protestant Bibles were taken from the original Hebrew and Greek, the only major exception being Miles Coverdale's (1535), taken from the Vulgate. Until Ronald Knox's Bible in 1949, Catholic Bibles were almost exclusively taken from the Vulgate.

Developing vernacular liturgies was essential to the Reformation. Partial translations of the Catholic liturgy already existed in the 'Primers.' In England the *Book of Common Prayer* (1549) rose out of English versions from the 'Primers' and translations from the Sarum Missal and Breviary. The translation committee was headed by Thomas Cranmer (1489–1566), Archbishop of Canterbury. For the next two hundred years, the *Book of Common Prayer* was translated into other European languages to serve Anglicans living overseas and missionary congregations. Other Reformers who created similar works of liturgical adaptation mixed with translation were Martin Luther and Jean Calvin (1509–56). As the Reformation spread there were translations of Luther's liturgy into Scandinavian languages, which were adopted for the normal worship. Translators also entered with gusto into religious controversy. Luther's and Calvin's polemical works were translated into most European languages and rebuttals, both Catholic and Protestant, were translated and circulated just as vigorously. Luther's works were translated into English by Richard Taverner (1505–75), who was responsible for Taverner's Bible (1539); and Thomas Norton (1532–84), a noted scourge of both Catholics and Lutherans, translated Calvin's *Les Institutions de la Religion Chrestienne* which Calvin himself had translated into French from his own Latin version. There was also some translation of Jewish prayer books and synagogue liturgies into vernacular languages, but as yet no Biblical work.

3.3 Literary and Educational Translation

The rise of the vernaculars as standard languages slowly shifted the focus of translation towards literature. However, what could be termed a 'modern language' changed subtly. The standard languages of political and cultural centers—English, French, Spanish, and Italian—moved in to replace those like Catalan and Provençal which were losing ground. In the recognized languages, literary translation brought to fruition what the Romans from the preclassical dramatists to Jerome had to teach. The Italians were in the forefront, one of the most important names being Petrarch (1304–74). The humanist printing presses, like those of Aldus Manutius (1455–1515), himself a fine translator, and Frobenius in Antwerp, commissioned vernacular translations and sold them widely.

In the rest of Europe, literary translation arrived late in the sixteenth century, though there were some earlier pioneers like Gavin Douglas (1474–1522), Bishop of Dunkeld, whose Scots version of Virgil's *Aeneid* is particularly interesting. The major inspiration was Classical, within an Italian cultural dominance, although Jean Baudoin (1564–1650), Lecteur to Marguerite of Navarre, translated a number of English books, including Sir Philip Sydney's *Arcadia*, into French. Poetry predominated, but by 1600 most of the common Latin and Greek prose writers had been translated into modern languages. In France, among the important translators were the group of poets centered around Pierre de Ronsard (1524–85), known as the *Pléiade*, whose interest lay in the latest from Italy as well as Greek and Latin literature; and Jacques Amyot (1513–93), whose French version of Plutarch's *Lives* was translated into English by Sir Thomas North (1535?–1601?). In England, Henry Howard, the Earl of Surrey (1517–47) was known for his translations of Petrarch and the Classics, and, the most famous of all, George Chapman (1559–1634) for his Homer. In Spain the Franciscan poet, Fray Luis de Leon (1520?–91), was also renowned for his translations from Classical literature.

Though the center of their intellectual world was in the Classics, the humanists saw popular education as a priority. Educational works by Erasmus (particularly the *Colloquia*) and Luis Vivès were widely translated. One of the most characteristic manifestations of this interest was concern for the education of the 'Prince,' that idealized Renaissance figure who embodied all possible human virtues. The tone was set by works such as *Doctrinall of Princes* (1533), translated by Sir Thomas Elyot (1490–1546) from the Greek of Isocrates, and the versions of Castiglione's *Il cortegiano* by Thomas Hoby (1524–85; English), Juan Boscan (d.1542; Spanish), and Bartholomew Clerke (1537–90; Latin). Machiavelli's work was translated but feared, and the English version of *Il principe* by Sir Thomas Bedingfield (d.1613) was unfavorably noticed by Queen Elizabeth I and remained in manuscript until after 1960.

4. The Age of Reason

4.1 Literary Translation

During the seventeenth and eighteenth centuries literary translation was dominated by French models, the notorious *belles infidèles*, which judged a translation according to contemporary norms of taste. In France the salon, in Britain the coffee-house, and everywhere in Europe the learned society, were essential to the development of translation at this time. The influence of the Royal Society and the Académie Française were seconded by periodicals like the *Gentleman's Magazine* and *L'année littéraire*. In France the dominant figure was Nicholas Perrot d'Ablancourt (1600–43) whose ruling principle was to 'remove everything that could wound our sensibilities.' The same principle was followed by Anne Dacier (1651–1720) in her Homer, which is a classic of the style. The dominant figure in Britain was John Dryden, who took his famous typology of 'metaphrase,' 'paraphrase,' and 'imitation' from French practice. He opted for paraphrase as ideal but, in practice, his poetic translation leans more towards 'imitation.' German translators, like Bodmer (1698–1783), Breitinger (1701–76), and Gottsched (1700–76) followed the same line.

Though Classical works were still the staple of the literary translator, there was also work from modern languages, much of it for recreational reading. This work included Latin versions of contemporary poets, the version of *Paradise Lost* by William Hogg adding to John Milton's international reputation. From the end of the seventeenth century, translators begin to demand authenticity and close translation. T. R. Steiner traces this change to the influence of Pierre-Daniel Huet (1630–1721), who championed literal translation. Among English translators affected by him were Sir Edward Sherburne (1616–1702). The new manner became standard later in the eighteenth century, as in the translations ascribed to Tobias Smollett (1721–71) in England, and taught in France by Charles Batteux (1713–80), a noted translator from Latin and Greek; in Spain, in Antonio Capmany Suris y Montpalau (1742–1813), who translated from French; and in Russia, in Vasily Trediskovsky (1703–1779), who worked from Classical languages. The eighteenth century is discussed at length in Tytler's 1791 *Essay on Translation*. But the old manner persisted—Abbé Prévost, one of the few who kept away from Classical translation, and specialized in translation from English, published a version of Richardson's *Clarissa Harlowe* that followed *Les belles infidèles* to the point of wounding the author. And Jacques Delille (1783–1813) was still translating like this during the French Revolution.

4.2 Religious Translation

The Dutch Protestants produced their standard *Statenbijbel* in 1637. Luther's German Bible was kept constantly up to date, and the Douay–Rheims Bible was updated by Bishop Richard Challoner (1691–1781) in 1763. The Bishop of Florence, Martini, translated the Bible into Italian between 1769 and 1781, and the official Spanish version of 1793 was also from the Vulgate. If attempts like the Bible of Lemaistre de Saci (1613–84) taken from the Vulgate are set aside, in France translation was merely an incidental part of Biblical scholarship. This gathered pace during the eighteenth century with the work of Richard Simon (1638–1712), the author of a huge Biblical encyclopedia, and Charles Houbigant (1686–1783), whose Latin version of the Hebrew Old Testament has an important preface on translation. This work came into its own in Britain at the end of the eighteenth century among those who were trying to replace the Authorized Version. The greatest translator of the period was George Campbell (1719–96), principal of Marischal College in Aberdeen; his *Four Gospels* (1789) was meant to be an ecumenical version. At the beginning of the nineteenth century, it was frequently published with the Epistles by James MacKnight (1721–1800) and the Books of Acts and Revelation by Philip Doddridge (1739–86). Campbell's work is notable for its voluminous notes and introduction, which is a summing-up of eighteenth-century thought on translation in general.

Strangely enough French Catholicism provided Protestant Europe with much devotional literature, Fénélon, the Archbishop of Cambrai, being a popular author. As Catholicism became more sure of itself, there was a great deal of translation of traditional devotional literature, like *The Imitation of Christ* ascribed to Thomas à Kempis (ca.1379–1471), into vernaculars—even in England after the break with Rome. There was a fair amount of polemical translation as well, the most virulent occasioned by the 1643 quarrel between the Port-Royal Jansenists (see *Port-Royal Tradition of General Grammar*) and the Jesuits, and centering round Pascal's *Lettres provinciales*, though the fallout from the Reformation kept translators going for the whole century. Translators tried to temper the acrimony by translating works on religious tolerance, like the religious writings of the great Dutch jurist, Hugo Grotius.

4.3 Technical Translation

At the beginning of the seventeenth century three scientific paradigms were fighting for supremacy, and for the warring scientists translation was a professional responsibility. First there was the scientific paradigm, of which Thomas Linacre, the founder of the Royal College of Physicians, had been typical; the second was the alchemist paradigm; and the third was the new philosophy of science taught by Francis Bacon and René Descartes. There was still a little translation from Classical writers, but the humanist versions remained standard.

Not only were the latest medical sources translated, but also medievals with a reputation like Albertus Magnus, Roger Bacon, and Ramon Lull. Alchemists and surgeons often wrote in their own languages. The most famous of these authors, Paracelsus and Glauber, were still translated into Latin for international consumption. In Britain in particular both vernacular and Latin translation had its political side, as is quite clear from noted Puritan apothecaries like Nicholas Culpeper (1616–54), and Royalist translators like Elias Ashmole (1617–92). The fight continued all over Europe until about 1680.

Between 1660 and 1700 there was a staggering amount of translation of the writings of Bacon, Descartes, and, at the end of the century, Isaac Newton's works. This was a time when scientists were beginning to write in their native languages, with consequent difficulties for readers in other countries. Robert Boyle and Isaac Newton commissioned their own Latin translations, and sat on the translators' shoulders. Descartes was well served by his French translator, le Duc de Luynes, and badly by the Dutch mathematician, Frans van Schooten (1615–60). In the rare cases where scientists were incapable of writing Latin (e.g., A. van Leeuwenhoek), they found anonymous Latin translators. Scientific translation was largely in the hands of the medical profession, encouraged by publication subsidies. The demand was so high that entrepreneurs made use of unemployed university graduates as translators, usually without acknowledging their help. The peak of this activity was in the period 1700–45, and coincided with the general acceptance of the scientific ideas of Descartes and Newton. Indeed it is doubtful whether Linnaeus, the famous botanist, Albrecht von Haller, the founder of physiology, or T. O. Bergman, the noted Swedish chemist, would have had the effect they did if they had not written in Latin and been translated into the vernaculars.

By the early eighteenth century vernacular work on medicine was usually translated directly into modern languages. By the late eighteenth century the center of scientific translation in Britain was moving north to the scientific communities of the Midlands and Scotland, who were in contact with France, Germany, and Sweden. In France the center was still Paris, where Louis-Bernard Guyton de Morveau (1737–1816) was particularly active in both translation and research. Creative physicians like William Lewis (1714–81) of Edinburgh, de Rusieux of Paris, and J. H. Ziegler of Germany were both translators and translated.

The seventeenth century had produced a lot of 'gentlemanly' translation, on gardening, building, and architecture, much of it from French and Italian sources; for example, the translations by John Evelyn

(1620–1706), on gardening and art, and translations of important Italian architects like Giacomo da Vignola and Andrea Palladio. The eighteenth century too was also marked by the translation of applied science, much of it from French, Swedish, and German. A good part of it dealt with agriculture—the concentration of population in the new towns demanded intensive agriculture if they were to be fed. There was also much on the manufacture and use of weapons, the French being in the forefront. Navigation and traditional crafts like dyeing also benefited from translators. However, the most radical changes came in pharmacy, which followed the 'new chemistry' so closely that its practice was reformed.

Education was an important issue and authors translated into most European languages, including Latin, ranged from Jan Amos Comenius to John Locke. Much translation of history, education, and the like was commissioned for political purposes. In Britain, Cromwell's Parliament commissioned legal and historical translation in an effort to legitimize the regime. On his return to power (1660), Charles II used translators like Dryden to translate political, if not polemical, works in support of the Royalist cause. In the following century, Adam Smith's *The Wealth of Nations* was translated into Spanish for the financial guidance of the government (1794) and in France there were at least four translations of Smith's work between 1793 and 1815, each coinciding with a change of regime. T. R. Malthus's work on population was also translated. As usual a good deal of this translation was anonymous, and done to meet specific scientific needs.

5. The Nineteenth Century

5.1 Romanticism and Literature

It was not until the rise of Romanticism that 'translation' became popularly identified with literary translation. The precursor of the movement, Johann Gottfried Herder (1744–1803), left to it a thoroughgoing Platonism that saw man and his society as creatures of the language spoken. For Herder, translators were the 'morning star' of a literature, because they introduced a literature to the great things in other literatures. His own contribution to German was a collection of translations from European poetry, the *Volkslieder* (1778–79), which imitated the original meters as the appropriate dress for the verse. Classical meters were acclimatized in German by Friedrich Klopstock (1724–1803): English experimentations, even by the poet Tennyson, were never successful.

Herder's view of translation as a hermeneutics of text was refined by Friedrich Daniel Ernst Schleiermacher (1768–1834). Romantic translators took on two interlinked tasks: the first was penetration to 'pure speech' supposed by Friedrich Hölderlin (1770–1843) to underlie all languages; the second was to present author and text unadorned to the reading public in the second language. Hence the famous classification by Johann Wolfgang von Goethe (1749–1832): literal, 'parody,' and interlinearversion. The first was word-for-word, and to be used if no other was possible; in 'parody' translation the translator imposed himself and his society on the original; and the interlinearversion was the penetration to the very essence of the original.

All of these theorists were practical translators as well; Hölderlin and Schleiermacher translating from Greek poetry, and Goethe and Wilhelm von Humboldt from both modern and ancient languages. In France, Goethe's ideas were taken up by Madame de Stael whose *Esprit des traductions* (1816) is one of the seminal statements of Romantic ideology. Such ideas were also illustrated by the version of *Paradise Lost* (1836) by René de Chateaubriand, who boasted that he had kept both the virtues and faults of the original. On a more pedestrian level, Amadée Pichot (1795–1877) publicized English literature with assiduous but extremely literal translations of contemporary writers. In Britain, after a much-reviled translation of *The Sorrows of Young Werther* from a French version, Goethe's most prominent publicist was Thomas Carlyle (1795–1881); in America, Bayard Taylor (1825–1878), and, in Italy, Michele Leone di Parma (1776–1858). But Goethe's ideas had special impact in Russia and other parts of Eastern Europe, where translation still had the creative status it had enjoyed in the Western Renaissance. Romantic poets, English, German, and French, were translated by Zhukovsky (1783–1852). Dickens was a favorite subject: both his French translator, Pichot, and his Russian, Vvedensky (1813–1855), wrote to him. Shakespeare was another favorite, the German Tieck-Schlegel version being almost a national monument, unmatched by any other version. Romanticism also occasioned the midcentury vogue of Eastern literature. Eastern languages were taken up in France by Emile-Louis Burnouf (1821–1907), and decades earlier in Germany by the Romantics, in particular Humboldt. The most famous English translation of Eastern poetry is probably *The Rubaiyat of Omar Khayyam* (1859) from the Persian by Edward Fitzgerald (1809–83).

The crux of the Romantic legacy was the nature of authenticity. It was given public airing in the famous quarrel between Matthew Arnold (1822–88) and F. W. Newman (1805–97) over translating Homer. Newman believed that the archaic and antique in Homer should be presented to the reader of English by conscious archaism, while Arnold insisted on presenting Homer as poetry that conformed to the contemporary experience of poetry. Probably the greatest of Newman's partisans were John Conington (1825–69), Professor of Latin at Oxford, and Sir Richard Jebb (1841–1905) of Cambridge. Robert Browning's *Agamemnon* (1877) is an excellent example of the Newman style, and his preface recalls that of Chateaubriand to Milton's *Paradise Lost*. Arnold's approach culminated in the translations of Dante and his circle by Dante Gabriel Rossetti (1828–82). His cardinal principle was that 'a good poem should not be turned into a bad.' In other countries, particularly France, translation showed much influence of contemporary literary movements. Charles Baudelaire (1821–67) changed Poe from a very good second-rate American writer into a first-class French one, and Leconte de Lisle (1818–94), a true Parnassian, went back to the Classics. In Germany the development of literary translation followed much the same lines as in England, with conflict between the antiquarian and the authentic in the Romantic sensibility.

Romantic ideas on translation also had their political side. The subject peoples of the Austro Hungarian Empire, particularly in what became Czechoslovakia, were strongly influenced by the nationalism inherent in Romanticism and plotted revolution. Elsewhere, for example, in Canada where English and French were in close contact, Romantic ideas on the teaching role of the translator affected the problems of preserving the identity of the minority; interpreting the two cultural groups to each other; and the French minority had to decide whether to absorb material from the dominant culture or to stand aloof. The Canadian situation is interesting for the critical role played by newspapers in fostering translation between the two languages, especially by serializing translated novels.

There was also some translation of libretti; this practice continued into the twentieth century. Gilbert and Sullivan operas were presented in German in Germany, and French and Viennese operettas (e.g., the Strauss family and Offenbach) in London in English. There was also some translation of French, Italian, and German operas into other European languages, though nowhere near the twentieth-century scale of such translation. German *lieder* and the French art song were also translated, often very badly, for the drawing-room soprano and tenor.

5.2 Religious Translation

The issue of updating the Bible did not go away. In 1836 a Catholic historian, Dr John Lingard (1771–1851), published a Bible with the New Testament translated from the Greek. Among Protestant efforts was the modernized King James Bible (1833) produced by the American lexicographer, Noah Webster. During the 1850s pressure began to mount in England for a revision of the Authorized Version, if not a completely new translation, for Biblical scholarship had advanced considerably. In 1870 the Convocation of the Anglican Province of Canterbury set up a committee to revise the Authorized Version. Other Protestant churches joined in. In 1881 the English New Testament was published, and in 1885 the whole Bible (the Revised Version). The American Bible Union (ABU) had been established in 1864, and sent observers to keep an eye on what the English Anglicans were doing. The American Standard Version was published in 1901.

Spain was still nervous of Bible translation, however, the British and Foreign Bible Society was happily supplying Protestant versions of the Bible in European languages—for example, a revision of Valera's 1625 Spanish version was reprinted many times between 1806 and 1817, and a Catalan New Testament was produced by J. M. Prat (1832). At the end of the nineteenth century, l'Abbé Augustin Crampon (1826–94) produced what was to become the standard French Catholic Bible of the early twentieth century. For French Protestants, the most important Bible was the version of Louis Ségond (1810–85) whose Old Testament came out in 1874; the New Testament followed in 1880.

The Jews were once again facing the ancient problem: a religiously vital social group which could read but not understand the sacred books. In America, Rabbi Isaac Leeser (1806–68) published his English version of the Old Testament in the Masoretic text in 1853. The Jewish Publication Society, founded in 1892, produced an official Jewish version in English in 1901. Other Jewish communities followed suit.

The Oxford Movement in the Anglican Church sought to prove its essential Catholicism by returning as far as possible to early Christian practices. There was much interest in the Fathers of the Church, in both doctrine and hymnody. The movement's search for ancient Christian hymns began with the Roman Breviary, then passed to the Paris Breviary, and finally to pre-Reformation rites like the Sarum (from Salisbury) and the York. The leading translator was John Mason Neale (1818–66), whose hymn versions took into account the traditional melodies of medieval service books. Most of his work appeared in *Hymns Ancient and Modern* (1861), edited by Reverend Sir H. W. Baker (1821–77). Another important contributor to this famous hymnbook was Catherine Winkworth (1827–78), an early feminist, whose speciality was translation from German, and particularly the Lutheran hymns.

5.3 Technical Translation

Technical translation in the nineteenth century did not benefit at all from the Romantic revolution; indeed its practice had continued in the same manner since the early seventeenth century. The work of Michael Faraday, J. J. Berzelius, the Swedish chemist, and other scientific pioneers were widely translated. The quantity of translations increased as the century went on, though now the scientist was no longer his own translator. In the humanities, by contrast, the task of translation was still regarded as the professional responsibility of contemporary philosophers and social scientists.

Less is known of the translation that went on in the bureaucracies of the Ottoman, Austro–Hungarian, or Russian empires, than of the work carried out in the empires outside Europe. European colonial expansion gathered pace during the nineteenth century. Training local people as interpreters was the first step: colonists then learned the native languages. Soon colonial administrators benefited from a loosely organized translation profession. In most places a system of professional certification had slowly developed. For example, in the previous century Sir William Jones (1746–94), though most famous for pointing out the striking similarity between Sanskrit and the major European languages, was an assiduous translator from Eastern languages, specializing in law. His ideas had considerable influence on later British colonial policy.

Tensions between French and English, and English and Spanish antedated British expansion in North America. The resulting warfare occasioned a fair amount of translation. Bilingual officers worked as volunteer translators between English and French or Spanish. Apart from this there is very little on record of anything beyond ad hoc translation before the British takeover of Canada in 1759, the Louisiana Purchase of 1803, and American expansion into the Spanish territories that now make up parts of Florida, Texas, and California. The press played a very important role. It was to it that the various Canadian governments (and also the government of Louisiana) later turned when they needed translators.

6. Missionary Translation

During the eighteenth century, European expansion into the New World revived ancient problems entailed in translating between sophisticated and unsophisticated languages. Little is known of how early Christian missionaries, like St Boniface (d.755), had faced the problems of creating literacy before being able to translate the Bible into languages previously unwritten. Until the sixteenth century it was trade not colonization, that usually went with the missionary. A new pattern developed in the Americas, where in the British, French, Spanish, and Portuguese dominions, missionary and colonist often arrived together, and at times cooperated. The practice of the New England and the Jesuit missionaries with Amerindian languages was typical: translation of the Bible and the introduction of Christian worship, for example, by Thomas Mayhew (1592–1657) and John Eliot (1604–1690) were preceded by and prepared for, the production of grammars and lexicons: literacy as well as conversion was an objective.

Missionary translation was first given direction by the formation of the *Congregatio pro Propaganda Fide* in Rome in 1662. There are reports of translations of the Bible into Eastern languages mainly from Catholics like St Francis Xavier (1506–52), and the Congregation has continued active translation. On the Protestant side, the Society for the Propagation of Christian Knowledge (1698), the Society for the Propagation of the Gospel in Foreign Parts (1701), and the Moravian Brotherhood (founded 1722) took a vital part in Bible translation into non-Indo-European languages. Perhaps the most important development was the foundation of the interdenominational British and Foreign Bible Society in 1804, which had as its sole aim the production and distribution of vernacular scriptures all over the world, including England and Wales. Early in the nineteenth century the Church Missionary Society of the Anglican Church entered into an agreement about cooperation. Parallel Bible societies were founded in Scotland and the United States. In many parts of the world Catholic and Protestant Bibles were in competition. There are extensive records of Protestant liturgical translation into the languages of the mission fields: the Tamil translation of the Lutheran liturgy published in Ceylon in 1781 is far from unusual. Indeed, Anglican translation of the *Book of Common Prayer* into the languages of the Indian subcontinent helped lay the foundations for the development of Eastern forms of Christianity. During the nineteenth century most of the vernacular scriptures published by these bodies were translated in the field, often with the help of native speakers.

In the United States in particular, linguists began to take a large hand in Bible translation in the mid-twentieth century. After World War II American Bible Societies merged into the United Bible Societies (UBS) with its own periodical, *The Bible Translator*. On the evangelical side the work of UBS was grouped around the Summer Institute of Linguistics, also known as the 'Wycliffe Bible Translators.' One of its leaders was Eugene Nida (b.1914), whose work on the theory of translation focused specifically on the Bible. The linguistics of the mid-twentieth century, with its strong anthropological bias, suited this work.

The Qu'rān was also translated early into European languages. There is a 'curiosity-oriented' translation into Latin dating from the twelfth century ascribed to Robertus Ketenensis and Hermannus Dalmata. This was republished in 1543 by Theodore Bibliander (1504–64). There are also a few sixteenth-century Latin versions of the Qu'rān for the information of Christian missionaries. It was a popular book among European translators during the nineteenth century, versions being made in all the important European languages. Because Muslims have the same attitude to the Word of God as Jews, translation of the Qu'rān for religious purposes is suspect. Nevertheless, a number of modern translations into European languages have been tolerated by the authorities for use by European Muslims. The Western interest in Eastern religions has also occasioned much translation and commentary on the Hindu scriptures.

7. The Twentieth Century

7.1 Religious Translation

7.1.1 Christian

The dominant motivation was the increasingly urgent need to replace the great European language translations of the past by up-to-date versions. This coincided with two contradictory movements—the centripetal force of ecumenism which increased pressures towards a Bible common to all Christian churches, and the centrifugal forces created by new types of Christian and Jewish fundamentalism. In English there is a huge number of Bibles, the best known early twentieth-century ones being *The New Testament: A New Translation* by James Moffat in 1913, with the Old Testament following in 1924, and *The New Testament: An American Translation* by Edgar J. Goodspeed (1923). In 1931 a version of the Old Testament by Powis Smith and others was published with Goodspeed's, the whole being known as *The Bible: An American Translation*.

Among 'official versions' in English the most notable Protestant versions are the American *Revised Standard Version* (1952) from the International Council for Religious Education, and the British *New English Bible* (1961) which was initiated by the Church of Scotland but which eventually became a joint effort by most of the mainstream Protestant denominations. Later on a printing of the *New English Bible* was authorized by the Catholic Church. The Catholic church first published the *Westminster Bible* (1913), Msgr. Ronald Knox's version was published in its entirety in 1949, but was superseded by the *Jerusalem Bible* in 1966. The Knox is the last important version from the Vulgate, and it was done with a close eye on the Greek and the Hebrew texts.

Other important modern Bibles are the Spanish versions by Nalcar-Colunga (1944), and Bover-Cantera (1957). The Catalan version, from the Benedictine Monastery at Montserrat, began publication in 1926, but the work was suspended between 1936 and 1950 by the anti-Catalan policies of the Franco government.

The Roman Catholic and various Orthodox churches produced bilingual service books. Liturgical reforms instituted by Pope Pius X (1903–14) encouraged the production of a very large number of missals of various states of completeness for the laity. There were also a few translations of the Divine Office for the laity and certain religious communities. One of the most interesting of these is *Byzantine Daily Worship* (1969) translated from the Greek *Horologion* (Breviary) and the ancient liturgy of St John Chrysostom for the Greek Uniate community worldwide. The Anglican Church continued translating the *Book of Common Prayer* into the languages of the British Empire and Commonwealth. Following Vatican II (1962–65) national commissions were set up throughout the Catholic world to organize the translation of the entire Roman Catholic liturgy into the vernaculars. For international languages like English, French, and German, there were international commissions that came to agreement on language standards and other matters. In the name of ecumenism the various churches cooperated in versions of common texts like the Creeds and the *Gloria in excelsis Deo*.

7.1.2 Jewish

The most notable Jewish Bible translators, mainly because of their very telling and coherent arguments for literal translation were the philosopher-theologian, Martin Buber (1878–1965), and Franz Rosenzweig (1886–1929), whose German Bible, with a preface, was published 1926–38. Their principles were taken up by Henri Meschonnic (1932) in France, and applied to secular translation as well. Jewish bilingual versions of the synagogue liturgies and private prayers go back a considerable time, at least to the sixteenth century. However, as Reform Jews began to worship in the local vernaculars, unilingual service books were produced from the middle of the twentieth century onwards. Among the Jewish Bibles in English, *The Holy Scriptures* by the Jewish Publication Society was published in 1917.

Probably the best of the modern versions is the French *Bible de Jérusalem* (1948–54) from the Ecole biblique de Jérusalem. The English *Jerusalem Bible* (1966) comes from the same team, and they also produced a Spanish translation (1987).

7.2 Technical Translation

The twentieth century saw the rise of the translating profession, centered on technical work. The trigger seems to have been the founding of the League of Nations in 1918. By that time many governments had translation offices for administrative purposes. After World War II these expanded quickly, following the postwar political and trade patterns. Private firms began to follow the lead of governments and created their own translation sections to translate everything from technical reports and instruction manuals to publicity. It was only a matter of time before freelance translators began organizing themselves as commercial operations and into societies like FIT (la Fédération Internationale des Traducteurs). Specialized training is a twentieth-century phenomenon, and it gained pace in the 1960s with courses being established in universities and specialized schools. There continued to be a lot of inhouse translator training; one of the finest translation schools in the world being run by the electronics firm, Philips, in The Netherlands.

There has been a growing body of theory of technical translation, with some attempt to relate it to the mainstream literary and religious work. One obvious result has been the creation of specialities like terminologist and documentalist. The great expansion of translation in the first half of the twentieth century occasioned experimentation in machine translation (MT), which stemmed from a memo from an American founder of the field, Warren Weaver, in 1947 on applying code-breaking techniques to languages. Results have proved limited. Its most useful spinoff has been the development of automated dictionaries.

7.3 Literary Translation

At the beginning of the twentieth century literary translation remained what it had traditionally been, a searching apprenticeship for the creative writer. Nineteenth-century manners of translation spilled over into the first half of the twentieth with the vaguely Swinburnesque manner of the translations from Greek by Gilbert Murray (1866–1957), and the versions of modern and Classical literature from Valéry Larbaud (1881–1957), Paul Valéry (1871–1945), André Gide (1869–1951), and the English version of Proust by Scott Moncrieff. In Germany figures like Ulrich von Wilamowitz-Moellendorf (1848–1931) carried the Romantic tradition to its limits. Reaction against the tradition started at the beginning of the century with Rudolf Borchardt (1877–1945), and continued in literary writers like Walter Benjamin (1892–1940). In Slavic Europe, translation has remained an activity central to the work of creative writers without excluding specialist translators of literature.

The decisive break in the tradition came with Symbolist writers and writers under Symbolist influence like Ezra Pound (1888–1972), Yves Bonnefoy (b.1923), the Russian, Balmont (1867–1943), and the German, Walter Benjamin, who developed the Romantic idea of the language shape having its own meaning. Attitudes and practice range from Benjamin's attempts to get rid of meaning altogether, to Pound and Henri Meschonnic, who successfully walk the tightrope between sound and sense, with some striking results. Bonnefoy, in particular, comes very close to some of the twentieth-century theorizing on the linguistic element in translation in his Shakespeare translations.

Under the pressure of changes in education, translation from Classical languages diversified: beside translations for the reader's recreation grew up translations to help students, for example, in English-speaking countries the Loeb editions from Harvard University Press and William Heinemann, and in French the Editions Budé. Translation began to acquire its own impressarios: one of the most important was Betty Radice (1912–85), a Classical scholar and excellent translator in her own right, who was editor of the Penguin Classics series.

It is in the translation of modern languages that there has been the most change. Theater has taken the interest of many translators, even if at times they chafe against what producers do to their texts. Translation of libretti has continued, some of it anonymous, and opera has attracted people of the caliber of W. H. Auden (1907–73). As had happened during the Middle Ages, hitherto unimportant languages and literatures have gained worldwide recognition through translation. Eastern European work has become influential, and smaller European countries important, as they appreciate that translation provides access to a greater audience for their literatures. Indeed at times, translation into the languages of non-Communist Europe was the only way in which dissident writers like Milan Kundera in Czechoslovakia, and Alexander Solzhenitsyn in the former Soviet Union could be published at all. As well, former European colonies developed their own distinctive literary voice; they attracted the notice of translators, and produced translators themselves, for example, Octavio Paz from Mexico. The number of translators from the former European colonies in Africa and Asia has been growing. Many bilingual countries have attempted to foster literary translation for the sake of national cohesion: Canada, for instance, subsidizes translation of Canadian French writers into English, and vice versa. At times translation has been used as it had been in nineteenth-century Europe, as a nationalist rallying-point in Quebec, Scotland, and Wales.

Interest has grown in hitherto unconsidered literatures. Many Classical translators, for instance, Peter Green, have taken up translation of modern Greek literature. There has also been increased interest in Eastern literatures by translators like I. A. Richards and Achilles Fang. The twentieth-century literary prizes have had an important influence on the extent of translation: Nobel prizewinners like Patrick White, the Australian, and Alexander Solzhenitsyn, himself a fine translator, have been translated worldwide.

New areas of translation have developed, including popular fiction for the mass market (e.g., the works of detective writers Georges Simenon and Agatha Christie) and film-dubbing, which reconciles the sense of what is said with the observable features of lip and face movement.

Theories of translation have followed changes in linguistic and literary theory. Symbolist theories of literature have been most prominent in the translation theories of people like Ezra Pound and Yves Bonnefoy. In Eastern Europe, translation theory has been of vital interest, for example, within the Prague School, whose linguistic theories did not prevent them from producing extremely perceptive work on poetics and translation. Linguistic theories of translation have been a feature of the twentieth century, though usually in complete isolation from the more traditional literary stream. In the English-speaking world, American structuralism gave rise to the theories and practice of the Summer Institute of Linguistics, typified by the work of Eugene Nida; and English translation theory has risen out of the work of J. R. Firth and M. A. K. Halliday. In the French-speaking world a contrastive linguistics applied to translation was developed from the Geneva School, chiefly from the theories of Charles Bally. Its first manifestation was the stylistique comparée of Malblanc, and Vinay & Darbelnet; it was further developed by reference to the theories of Gustave Guillaume and Antoine Culioli's theories on enunciation. Like the linguistics of Prague, contrastive linguistics takes account of discourse phenomena. The end of the 1980s saw some attempt to combine both linguistic and literary theories of translation by absorbing the idea of linguistic transfer into a concept of translation as a communicative act whose source and target texts are embedded in differing cultural matrices.

Bibliography

Bassnett-McGuire S 1981 *Translation Studies*. Methuen, London

Blake N F 1969 *Caxton and his World*. André Deutsch, London

Beer J (ed.) 1988 *Medieval Translators and their Craft*. Medieval Institute, Kalamazoo, Michigan

Cambridge History of the Bible 1963–70, 3 vols. Cambridge University Press, Cambridge

Cary E 1956 *La traduction dans le monde moderne*. Georg, Geneva

Cohen J M 1962 *English Translators and Translations*. Longmans for the British Council, London

Conley C H 1927 *The First English Translators of the Classics*. Yale University Press, New Haven, Connecticut

Courcelle P 1943 *Les lettres grecques en occident de Macrobe à Cassiodore*. De Boccard, Paris

Delisle J 1987 *La traduction au Canada 1534–1984*. Les Presses de l'Université d'Ottawa, Ottawa

Dunlop D M 1960 The work of translation at Toledo. *Babel* **6**: 55–99

Ellis R (ed.) 1989 *The Medieval Translator*. Boydell & Brewer, Woodbridge

Firth C H (ed.) 1939 *Lives of the English Poets*. Clarendon Press, Oxford

Horguelin P 1975 *Histoire de la traduction: Domaine français*. Linguatech, Montreal

Jourdain A M M B 1843 *Recherches critiques sur l'âge et l'origine des traductions latines d'Aristote*. Joubert, Paris

Kelly J N D 1975 *Jerome: His Life, Writings and Controversies*. Duckworth, London

Kelly L G 1979 *The True Interpreter*. Basil Blackwell, Oxford

Knox R A 1957 *On English Translation*. Romanes Lecture, Oxford

Kushner E, Chavy P (eds.) 1981 Translation in the Renaissance/Traduction à la renaissance. *Canadian Review of Comparative Literature* **8(2)** (whole issue)

Ladborough R W 1938–39 Translation from the Ancients in seventeenth-century France. *Journal of the Warburg Institute* **2**: 85–104

Lathrop H B 1967 *Translations from the Classics into English from Caxton to Chapman 1477–1620*. Octagon Books, New York

Lefevere A 1977 *Translating Literature: The German Tradition from Luther to Rosenzweig*. Van Gorcum, Assen

Leighton L G 1984 *The Art of Translation: Kornei Chukovsky's A High Art*. University of Tennessee Press, Knoxville, Tennessee

Matthiessen F O 1931 *Translation: An Elizabethan Art*. Harvard University Press, Cambridge, Massachusetts

Mohrmann C 1957 *Liturgical Latin: Its Origin and Character*. Burns & Oates, London

Mukherjee P 1981 *Translation as Discovery and Other Essays on Indian Literature in Translation*. Allied Publishers, New Delhi

Norton G P 1984 *Ideology and Language of Translation in Renaissance France*. Droz, Geneva

Piercy L T 1984 *The Mediated Muse: English Translators of Ovid* 1560–1700. Archon Books, Hamden, Connecticut

Pound E 1954 *Literary Essays of Ezra Pound*. New Directions, Norfolk, Connecticut

Rener F M 1989 *Interpretatio: Language and Translation from Cicero to Tytler*. Rodopi, Amsterdam

Santoyo J-C 1987 *Teoria y critica de la traducción: Antologia*. Universitat Autònoma de Barcelona, Bellaterra

Scott M A 1916 *Elizabethan translators from the Italian*. Houghton Mifflin, Boston, Massachusetts

Selver P 1966 *The Art of Translating Poetry*. Baker, London

Setton K M 1956 The Byzantine background to the Italian Renaissance. *Proceedings of the American Philosophical Society* **100**: 1–76

Steiner G 1975 *After Babel*. Oxford University Press, Oxford

Steiner T R 1975 *English Translation Theory, 1650–1800*. Van Gorcum, Assen

Strand K A 1961 *Reformation Bibles in the Crossfire*. University of Michigan Press, Ann Arbor, Michigan

Thorndike L 1923–58 *A History of Magic and Experimental Science*, 8 vols. Columbia University Press, New York

Tytler A F 1813 *Essays on the Principles of Translation*, 3rd rev. edn. Edinburgh. Repr. with an intro. by Huntsman J F 1978 Benjamins, Amsterdam

Weiss R 1950 Translators from the Greek of the Angevin Court of Naples. *Rinascimento* **1**: 194–226

Zuber O 1980 *The Languages of Theatre*. Pergamon, Oxford

Zuber R 1968 *Les belles infidèles et la formation du goût classique*. Armand Colin, Paris

Machine Translation: A Brief History

W. John Hutchins

The translation of natural languages by machine, first dreamt of in the seventeenth century, has become a reality in the late twentieth century. Computer programs are producing translations. The translations are not perfect, for that is an ideal to which no human translator can aspire, nor are they translations of literary texts, for the subtleties and nuances of poetry are beyond computational analysis, but translations of technical manuals, scientific documents, commercial prospectuses, administrative memoranda, medical reports. Machine translation is not primarily an area of abstract intellectual inquiry but the application of computer and language sciences to the development of systems answering practical needs.

After an outline of basic features, the history of machine translation is traced from the pioneers and early systems of the 1950s and 1960s, the impact of the Automatic Language Processing Advisory Committee (ALPAC) report in the mid-1960s, the revival in the late 1970s, the appearance of commercial and operational systems in the 1980s, research during the 1980s, new developments in research in the 1990s, and the growing use of systems in the 1990s. This brief history can mention only the major and most significant systems and projects, and for more details readers are referred to the publications listed in the bibliography.

1. Basic Features and Terminology

The term 'machine translation' (MT) refers to computerized systems responsible for the production of translations with or without human assistance. It excludes computer-based translation tools which support translators by providing access to on-line dictionaries, remote terminology databanks, transmission and reception of texts, etc. The boundaries between machine-aided human translation (MAHT) and human-aided machine translation (HAMT) are often uncertain and the term computer-aided translation (CAT) can cover both, but the central core of MT itself is the automation of the full translation process.

Although the ideal may be to produce high-quality translation, in practice the output of MT systems is usually revised (postedited). It should be noted that in this respect MT does not differ from the output of most human translators which is normally revised by another translator before dissemination. However, the types of errors produced by MT systems do differ from those of human translators (incorrect prepositions, articles, pronouns, verb tenses, etc.). Postediting is the norm but, in certain circumstances, MT output may be unedited or only lightly revised, if, for example, it is intended only for specialists familiar with the text subject. Output might also serve as a rough draft for a human translator, as a pretranslation.

The translation quality of MT systems may be improved either, most obviously, by developing more sophisticated methods or by imposing certain restrictions on the input. The system may be designed, for example, to deal with texts limited to the sublanguage (vocabulary and grammar) of a particular subject field (e.g., biochemistry) and/or document type (e.g., patents). Alternatively, input texts may be written in a controlled language, which restricts the range of vocabulary, avoids homonymy and polysemy and complex sentence structures. A third option is to require input texts to be marked (pre-edited) with indicators of prefixes, suffixes, word divisions, phrase and clause boundaries, or of different grammatical categories (e.g., the noun *cónvict* and its homonymous verb *convíct*). Finally, the system itself may refer problems of ambiguity and selection to human operators (usually translators) for resolution during the processes of translation itself, in an interactive mode.

Systems are designed either for two particular languages (bilingual systems) or for more than a single pair of languages (multilingual systems). Bilingual systems may be designed to operate in only one direction (unidirectional), e.g., from Japanese into English, or in both directions (bidirectional). Multilingual systems are usually intended to be bidirectional; most bilingual systems are unidirectional.

In overall system design, there have been three basic types. The first (and historically oldest) type is generally referred to as the 'direct translation' approach: the MT system is designed in all details specifically for one particular pair of languages, e.g., Russian as the language of the original texts, the source language, and English as the language of the translated texts, the target language. Translation is direct from the source language (SL) text to the target language (TL) text; the basic assumption is that the vocabulary and syntax of SL texts need not be analyzed any more than strictly necessary for the resolution of ambiguities, the correct identification of TL expressions and the specification of TL word order. In other words, SL analysis is oriented specifically to one particular TL. Typically, systems consist of a large bilingual dictionary and a single monolithic program for analyzing and generating texts; such 'direct translation' systems are necessarily bilingual and unidirectional.

The second basic design strategy is the interlingua approach, which assumes that it is possible to convert SL texts into semantico-syntactic representations common to more than one language. From such interlingual representations texts are generated into other languages. Translation is thus in two stages: from SL to the interlingua (IL) and from the IL to the TL. Procedures for SL analysis are intended to be SL-specific and not oriented to any particular TL; likewise programs for TL synthesis are TL-specific and not designed for input from particular SLs. A common argument for the interlingua approach is economy of effort in a multilingual environment. Translation from and into *n* languages requires $n(n-1)$ bilingual 'direct translation' systems; but with translation via an interlingua just $2n$ interlingual programs are needed. With more than three languages the interlingua approach is claimed to be more economic. On the other hand, the complexity of the interlingua itself is greatly increased. Interlinguas may be based on an artificial language, an auxiliary language such as Esperanto, a natural language, a set of semantic primitives common to all languages, or a 'universal' language-independent vocabulary.

The third basic strategy is the less ambitious transfer approach. Rather than operating in two stages through a single interlingual representation, there are three stages involving underlying (abstract) representations for both SL and TL texts. The first stage converts SL texts into abstract SL-oriented representations; the second stage converts these into equivalent TL-oriented representations; and the third generates the final TL texts. Whereas the interlingua approach necessarily requires complete resolution of all ambiguities in the SL text so that translation into any other language is possible, in the transfer approach only those ambiguities inherent in the language in question are tackled; problems of lexical differences between languages are dealt with in the second stage (transfer proper). Transfer systems consist typically of three types of dictionaries (SL dictionary/ies containing detailed morphological, grammatical and semantic information, similar TL dictionary/ies, and a bilingual dictionary relating base SL forms and base TL forms) and various grammars (for SL analysis, TL synthesis and for transformation of SL structures into TL forms).

Within the stages of analysis and synthesis (or generation), most MT systems exhibit clearly separated components involving different levels of linguistic description: morphology, syntax, semantics. Hence, analysis may be divided into morphological analysis (identification of word endings, word compounds), syntactic analysis (identification of phrase structures, dependency, subordination, etc.), semantic analysis (resolution of lexical and structural ambiguities); synthesis may likewise pass through semantic synthesis (selection of appropriate compatible lexical and structural forms), syntactic synthesis (generation of required phrase and sentence structures), and morphological synthesis (generation of correct word forms). In transfer systems, the transfer component may also have separate programs dealing with lexical transfer (selection of vocabulary equivalents) and with structural transfer (transformation into TL-appropriate structures). In some earlier forms of transfer systems, analysis did not involve a semantic stage; transfer was restricted to the conversion of syntactic structures, i.e., syntactic transfer.

In many older systems, particularly those of the 'direct translation' type, the components of analysis, transfer and synthesis were not always clearly separated. Some of them also mixed data (dictionary and grammar) and processing rules and routines. Later systems have exhibited various degrees of modularity, so that system components, data and programs can be adapted and changed without damage to overall system efficiency. A further stage in some recent systems is the reversibility of analysis and synthesis components, i.e., the data and transformations used in the analysis of a particular language are applied in reverse when generating texts in that language.

The direct translation approach was typical of the 'first generation' of MT systems. The indirect approach of interlingua and transfer based systems is often seen to characterize the 'second generation' of MT system types. Both are based essentially on the specification of rules (for morphology, syntax, lexical selection, semantic analysis, and generation). Most recently, corpus-based methods have changed the traditional picture (see Sect. 8 below). During the 1990s, there is beginning to emerge a 'third generation' of hybrid systems combining the rule-based approaches of the earlier types and the more recent corpus-based methods. The differences between direct and indirect, transfer and interlingua, rule-based, knowledge-based and corpus-based are becoming less useful for the categorization of systems. Transfer systems incorporate interlingual features (for certain areas of vocabulary and syntax); interlingua systems include transfer components; rule-based systems make increasing use of probabilistic data and stochastic methods; statistics- and example-based systems include traditional rule-based grammatical categories and features; and so forth. These recent developments underline what has always been true, namely that MT research and MT systems adopt a variety of methodologies in order to tackle the full range of language phenomena, complexities of terminology and structure, misspellings, 'ungrammatical' sentences, neologisms, etc. The development of an operational MT systems is necessarily a long-term 'engineering' task applying techniques which are well-known, reliable and well tested.

2. Precursors and Pioneers, 1933–56

The use of mechanical dictionaries to overcome the barriers of language was first suggested in the seventeenth century. However, it was not until the twentieth century that the first concrete proposals were made, in patents issued independently in 1933 by

George Artsrouni, a French–Armenian, and by a Russian, Petr Smirnov-Troyanskii. Artsrouni designed a storage device on paper tape which could be used to find the equivalent of any word in another language; a prototype was apparently demonstrated in 1937. The proposals by Smirnov-Troyanskii were, in retrospect, more significant. He envisaged three stages of mechanical translation: first, an editor knowing only the source language (SL) was to undertake the 'logical' analysis of words into their base forms and syntactic functions; second, the machine was to transform sequences of base forms and functions into equivalent sequences in the target language; finally, another editor knowing only the target language (TL) was to convert this output into the normal forms of his own language. Troyanskii envisaged both bilingual and multilingual translation. Although his patent referred only to the machine which would undertake the second stage, Troyanskii believed that 'the process of logical analysis could itself be mechanized.'

Troyanskii was ahead of his time and was unknown outside Russia when, within a few years of the invention of computers, the possibility of using them for translation was first discussed in 1947 by Warren Weaver of the Rockefeller Foundation and Andrew D. Booth, a British crystallographer. On his return to Birkbeck College (London), Booth explored the mechanization of a bilingual dictionary and began collaboration with Richard H. Richens (Cambridge), who had independently been using punched cards to produce crude word-for-word translations of scientific abstracts. However, it was a memorandum from Weaver in July 1949 which brought the idea of MT to general notice (Weaver 1949). He outlined the prospects and suggested various methods: the use of wartime cryptography techniques, statistical methods, Shannon's information theory, and exploration of the underlying logic and universal features of language, 'the common base of human communication.'

Within a few years research had begun at the University of Washington (Seattle), at the University of California at Los Angeles, and at the Massachusetts Institute of Technology. It was at MIT in 1951 that the first full-time researcher in MT was appointed, Yehoshua Bar-Hillel. A year later he convened the first MT conference, where the outlines of future research were already becoming clear. There were proposals for dealing with syntax by Victor Oswald and by Bar-Hillel (his categorial grammar), suggestions that texts should be written in MT-oriented restricted languages, and arguments for the construction of sublanguage systems. It was obvious that fully automatic translation would not be achieved without long-term basic research and, in the interim, human assistance was essential, either to prepare texts or to revise the output (known already as pre- and postediting). A number of participants considered that the first requirement was to demonstrate the feasibility of MT. Accordingly, at Georgetown University, Leon Dostert collaborated with IBM on a project which resulted in the first public demonstration of a MT system in January 1954. A carefully selected sample of 49 Russian sentences was translated into English, using a very restricted vocabulary of 250 words and just 6 grammar rules. Although it had little scientific value, it was sufficiently impressive to stimulate the large-scale funding of MT research in the USA and to inspire the initiation of MT projects elsewhere in the world, notably in the former USSR.

3. The Decade of High Expectation and Disillusion, 1956–66

In the 1950s and 1960s research tended to polarize between empirical trial-and-error approaches, often adopting statistical methods with immediate working systems as the goal, and theoretical approaches, involving fundamental linguistic research and aiming for long-term solutions. The contrasting methods were usually described at the time as 'brute-force' and 'perfectionist' respectively. Any evaluation of the period must remember that computer facilities were frequently inadequate; much effort was devoted to improving basic hardware (paper tapes, magnetic media, access speeds, etc.) and to devising programming tools suitable for language processing. Some groups were inevitably forced to concentrate on theoretical issues, particularly in Europe and the former USSR. For political and military reasons, most US research was for Russian–English translation, and most Soviet research on English–Russian systems.

The research under Erwin Reifler at the University of Washington (Seattle) epitomized the word-for-word approach; it involved the construction of large bilingual dictionaries where lexicographic information was used not only for selecting lexical equivalents but also for solving grammatical problems without the use of syntactic analysis. Entries gave English translations with rules for local reordering of output. The huge lexicon made extensive use of English 'cover terms' for Russian polysemes, the inclusion of phrases and clauses and the classification of vocabulary into sublanguages. After initial work on German and English, the group was engaged on the foundations of a Russian–English system for the 'photoscopic store,' a large memory device rather similar to the laser disk. From 1958 practical development was directed by Gilbert King at the IBM Corporation (Yorktown Heights, New York). A system was installed for the US Air Force which produced translations for many years, until replaced in 1970 by Systran (see Sect. 6 below). By any standards the output was crude and sometimes barely intelligible but, unlike some MT researchers at the time, King never made excessive claims for his system. With all its deficiencies, it was satisfying basic information needs of scientists.

The empirical attitude was exemplified by the RAND Corporation project (1950–60), which distrusted current linguistic theory and emphasized statistical analyses. From a large corpus (Russian physics texts) were prepared bilingual glossaries with grammatical information and simple grammar rules; a computer program was written for a rough translation; the result was studied by posteditors who indicated errors; the revised text was analyzed; the glossaries and the rules were revised; the corpus was translated again; and so the process continued in cycles of translation and postediting. The main method of analysis was statistical distribution, but it was at RAND that David Hays developed the first parser based on dependency grammar.

The research under Leon Dostert at Georgetown University had a more eclectic approach, undertaking empirical analyses of texts only when traditional grammatical information was inadequate. The Georgetown group was the largest in the USA and there were considerable differences of viewpoint among its members. Four groups were set up, each encouraged to submit their methods for testing in open competition on a Russian chemistry text. Ariadne Ljukanov's 'code-matching' method produced excellent results but apparently with ad hoc corpus-specific rules; the 'syntactic analysis' method by Paul Garvin (who had prepared the linguistic basis for the 1954 demonstration system) was not ready in time for the test; and the 'sentence-by-sentence' method by Anthony Brown was an example of the empirical cyclical method. The 'general analysis' method by a group under Michael Zarechnak was the method adopted and named Georgetown Automatic Translation (GAT). This had three levels of analysis: morphological (including identification of idioms), syntagmatic (agreement of nouns and adjectives, government of verbs, modification of adjectives, etc.) and syntactic (subjects and predicates, clause relationships, etc.). GAT was initially implemented on the SERNA system, largely the work of Peter Toma (later designer of Systran; see Sect. 6 below), and then with the programming method developed by Brown for his own separate French–English system. In this form it was successfully demonstrated in 1961 and 1962 and, as a result, Russian–English systems were installed at Euratom in Ispra (Italy) in 1963 and at the Oak Ridge National Laboratory of the US Atomic Energy Commission in 1964.

Further development of his parsing method was continued by Paul Garvin at the Ramo-Wooldridge Corporation from 1960 to 1967. Garvin sought a middle way between the empiricists and the perfectionists. His fulcrum method was essentially a dependency parser, a linguistic pattern recognition algorithm which identified the fulcrum of a structure and the relationships of dependent elements to the fulcrum. At a later stage, Garvin introduced heuristic methods, employing statistical information when appropriate. The method was also applied at Wayne State University (1958–72) in the development of a Russian–English system.

Anthony Oettinger at Harvard University believed in a gradualist approach. From 1954 to 1960 the group concentrated on the compilation of a massive Russian–English dictionary, to serve as an aid for translators (a forerunner of the now common computer-based dictionary aids), to produce crude word-for-word translations for scientists familiar with the subject, and as the basis for more advanced experimental work. From 1959, research focused on the 'predictive syntactic analyzer'—originally developed at the National Bureau of Standards under Ida Rhodes—which was a system for the identification of permissible sequences of grammatical categories (nouns, verbs, adjectives, etc.) and the probabilistic prediction of following categories. The results were often unsatisfactory, caused primarily by the enforced selection at every stage of the 'most probable' prediction. The system was revised to examine all possible predictions. (This was the Multiple-path Predictive Analyzer, from which was later developed William Woods's familiar Augmented Transition Network parser.) However, the results were equally unsatisfactory: multiple parsings were produced of even apparently quite unambiguous sentences; some kind of semantic analysis to 'filter' out undesirable parses was clearly needed. By 1965 the group had effectively ceased MT research.

Research at MIT, started by Bar-Hillel in 1951, was directed by Victor Yngve from 1953 until its end in 1965. Whereas other groups saw syntax as an adjunct to lexicographic transfer, as a means of resolving ambiguities and rearranging TL output, Yngve placed syntax at the center. Translation was a three-stage process: a SL grammar analyzed input sentences as phrase structure representations; a 'structure transfer routine' converted them into equivalent TL phrase structures; and the TL grammar rules produced output text. There is some evidence of the influence of transformational grammar (Chomsky was associated with the project for two years), but in many respects the practicalities of MT led MIT researchers away from Chomskyan theory. Much was achieved both in basic syntactic research and on developing the first string-handling programming language (COMIT). But eventually the limitations of the 'syntactic transfer' approach became obvious. By the mid-1960s Yngve acknowledged that MT research had come up against the 'semantic barrier [. . .] and that we will only have adequate mechanical translations when the machine can "understand" what it is translating' (Yngve 1964).

The Linguistic Research Center (LRC) at the University of Texas was founded by Winfred Lehmann in

1958 and, like MIT, concentrated on basic syntactic research of English and German. Efforts were made to devise reversible grammars to achieve bidirectional translation within an essentially 'syntactic transfer' approach. The foundations were laid for the later successful development of the METAL system (see Sects. 5 and 6 below).

At the University of California, Berkeley, the project under the direction of Sydney Lamb stressed the importance of developing maximally efficient dictionary routines and a linguistic theory appropriate for MT. Lamb developed his stratificational grammar with networks, nodes, and relations paralleling the architecture of computers. Translation was seen as a series of decoding and encoding processes, from the graphemic stratum of SL text through its morphemic and lexemic strata to a sememic stratum, from which TL text could be generated by passing through a similar series of strata. Translation was characterized as word-by-word, with each word examined within the broadest possible environment and not limited by sentence boundaries or immediate contexts.

There were no American groups taking the interlingua approach. This was the focus of projects elsewhere. At the Cambridge Language Research Unit, Margaret Masterman and her colleagues adopted two basic lines of research: the development of a prototype interlingua producing crude 'pidgin' (essentially word-for-word) translations, and the development of tools for improving and refining MT output, primarily by means of the rich semantic networks of a thesaurus (conceived as lattices of interlocking meanings). At Milan, Silvio Ceccato concentrated on the development of an interlingua based on conceptual analysis of words (species, genus, activity type, physical properties, etc.) and their possible correlations with other words in texts.

In the former USSR research was as vigorous as in the USA and showed a similar mix of empirical and basic theoretical approaches. At the Institute of Precision Mechanics research began in 1955, shortly after a visit by D. Ju. Panov to see a demonstration of the IBM–Georgetown system. Experiments on English–Russian translation were on similar lines to the approach at Georgetown, but with less practical success. More basic research was undertaken at the Steklov Mathematical Institute under Lyapunov, Kulagina and others, mainly towards French–Russian translation. As at MIT, attention was paid to the development of programming tools for linguistic processes. The research by Igor Mel'chuk and others at the Institute of Linguistics in Moscow was more theoretical in nature, including work on interlinguas and leading to the stratificational 'meaning–text' model as a basis for MT (see Sect. 5 below). However, the main center for interlingua investigations was Leningrad University, where a team under Nikolai Andreev conceived of an interlingua not as an abstract intermediary representation (which was Mel'chuk's approach) but as an artificial language complete in itself with its own morphology and syntax, and having only those features statistically most common to a large number of languages.

By the mid-1960s MT research groups had been established in many countries throughout the world, including most European countries (Hungary, Czechoslovakia, Bulgaria, Belgium, Germany, France, etc.), China, Mexico, and Japan. Many of these were shortlived and with no subsequent influence. But some groups created at the time became important later, in particular the project which began in 1960 at Grenoble University.

4. The ALPAC Report and its Consequences

In the 1950s and early 1960s optimism was high; developments in computing and in formal linguistics, particularly in the area of syntax, seemed to promise great improvement in quality. There were many predictions of imminent breakthroughs and of fully automatic systems operating within a few years. However, disillusion grew as the complexity of the linguistic problems became more and more apparent. In a review of MT progress, Bar-Hillel (1960) criticized the prevailing assumption that the goal of MT research should be the creation of fully automatic high quality translation (FAHQT) systems producing results indistinguishable from those of human translators. He argued that it was not merely unrealistic, given the current state of linguistic knowledge and computer systems, but impossible in principle. For example, the word *pen* can have at least two meanings (a container for animals or children, and a writing implement). In the sentence *The box was in the pen* one knows that only the first meaning is plausible; the second meaning is excluded by one's knowledge of the normal sizes of (writing) pens and boxes. Bar-Hillel contended that no computer program could conceivably deal with such 'real world' knowledge without recourse to a vast encyclopedic store. His argument carried much weight at the time. Many researchers were already encountering similar 'semantic barriers' for which they saw no straightforward solutions. Bar-Hillel recommended that MT should adopt less ambitious goals, it should build systems which made cost-effective use of man–machine interaction.

In 1964 the government sponsors of MT in the USA formed the Automatic Language Processing Advisory Committee (ALPAC) to examine the prospects. In its famous 1966 report it concluded that MT was slower, less accurate, and twice as expensive as human translation and that 'there is no immediate or predictable prospect of useful machine translation.' It saw no need for further investment in MT research; instead it recommended the development of machine aids for translators, such as automatic dictionaries, and continued support of basic research in computational linguistics. The ALPAC report was widely condemned as narrow, biased, and shortsighted. It is true that it failed to recognize, for example, that revision of manually produced translations is essential for high quality, and it was unfair to criticize MT for needing to postedit output. It may also have misjudged the economics of computer-based translation, but large-scale support of current approaches could not continue. The influence of the ALPAC report was profound. It brought a virtual end to MT research in the USA for over a decade and MT was for many years perceived as a complete failure.

5. The Quiet Decade, 1967–76

In the USA the main activity had concentrated on English translations of Russian scientific and technical materials. In Canada and Europe the needs were quite different. The Canadian government's bicultural policy created a demand for English–French (and to a less extent French–English) translation beyond the capacity of the market. The problems of translation were equally acute in Europe, in particular within the European Community with growing demands for translations of scientific, technical, administrative and legal documentation from and into all the Community languages. The focus of MT activity switched from the USA to Canada and to Europe.

At Montreal, research began in 1970 on a syntactic transfer system for English–French translation. The TAUM project (Traduction Automatique de l'Université de Montréal) had two major achievements: first, the Q-system formalism, a computational metalanguage for manipulating linguistic strings and trees and the foundation of the PROLOG programing language now widely used in natural language processing; second, the METEO system for translating weather forecasts. Designed specifically for the restricted vocabulary and limited syntax of meteorological reports, METEO has been successfully operating since 1976 (albeit since 1984 in a new version running under a different programming language, GRAMR, developed subsequently by the original designer of METEO, John Chandioux). An attempt by TAUM to repeat the success with another sublanguage, that of aviation manuals, failed to overcome the problems of complex noun compounds and phrases (e.g., *hydraulic ground test stand pressure and return line filters*), problems which would defeat human translators without relevant subject knowledge. TAUM came to an end in 1981.

The principal experimental efforts of the decade focused on interlingua approaches, with more attention to syntactic aspects than previous projects at Cambridge, Milan, and Leningrad. Between 1960 and 1971 the group established by Bernard Vauquois at Grenoble University developed an interlingua system for translating Russian mathematics and physics texts into French. The 'pivot language' of CETA (Centre d'Etudes pour la Traduction Automatique) was a formalism for representing the logical properties of syntactic relationships. It was not a pure interlingua as it did not provide interlingual expressions for lexical items; these were translated by a bilingual transfer mechanism. Syntactic analysis produced first a phrase-structure (context-free) representation, then added dependency relations, and finally produced a 'pivot language' representation in terms of predicates and arguments. After substitution of TL lexemes (French), the 'pivot language' tree was converted first into a dependency representation and then into a phrase structure for generating French sentences. A similar model was adopted by the LRC at Texas during the 1970s in its METAL system: sentences were analyzed into 'normal forms', semantic propositional dependency structures with no interlingual lexical elements. The research by Mel'chuk in the former USSR towards an interlingua system was more ambitious. His influential 'meaning–text' model combined a stratificational dependency approach (six strata: phonetic, phonemic, morphemic, surface syntactic, deep syntactic, semantic) with a strong emphasis on lexicographic aspects of an interlingua. Fifty universal 'lexical functions' were identified at the deep syntactic stratum covering paradigmatic relations (synonyms, antonyms, conversives (*fear: frighten*), verbs and corresponding agentive nouns (*write: writer, prevent: obstacle*), etc.) and a great variety of syntagmatic relations (inceptive verbs associated with given nouns, *conference: open*, *war: break out*; idiomatic causatives, *compile: dictionary*, *lay: foundations*, etc.) Although Mel'chuk emigrated to Canada in 1976 his ideas continued to inspire Soviet MT research.

By the mid-1970s, however, the future of the interlingua approach seemed to be in doubt. Both the LRC and CETA projects had problems which were attributed to the rigidity of the levels of analysis (failure at any stage meant failure to produce any output), the inefficiency of parsers (too many partial analyses which had to be filtered out), and in particular the loss of information about the surface forms of SL input which could have been used to guide the selection of TL forms and the construction of acceptable TL sentence structures. As a consequence, it became widely accepted that the less ambitious transfer approach offered better prospects.

6. Operational and Commercial Systems in the 1970s and 1980s

During the 1980s MT advanced rapidly on many fronts. Many new operational systems appeared, the commercial market for MT systems of all kinds expanded, and MT research diversified in many directions.

The revival was laid in the decade after ALPAC. Systems were coming into operational use and attracting public attention. The Georgetown systems had been operating since the mid-1960s. As well as METEO, two other sublanguage systems had appeared: in 1970 the Institut Textile de France introduced TITUS, a multilingual system for translating abstracts written in a controlled language, and in 1972 came CULT (Chinese University of Hong Kong) for translating mathematics texts from Chinese into English, a 'direct translation' system requiring extensive pre- and post-editing. More significant, however, were the installations of Systran in 1970 at the US Air Force for Russian–English translation and in 1976 at the European Communities for English–French translation.

Systran has been the most successful operational system so far. Developed by Peter Toma, who had previously worked for the Georgetown project, and designed initially as a 'direct translation' system, its oldest version is the Russian–English system at the USAF Foreign Technology Division (Dayton, Ohio) which translates over 100,000 pages a year at an accuracy claimed to be over 95 percent. At the Commission of the European Communities (CEC) the English–French version was followed shortly by systems for French–English, English–Italian, and subsequently for combinations of most other languages of the European Communities (now European Union). The original 'direct' design has been greatly modified, with increased modularity and greater compatibility of the analysis and synthesis components of different versions, enabling cost reductions when developing new language pairs. Outside the CEC, Systran has been installed at a number of intergovernmental institutions, e.g., NATO and the International Atomic Energy Authority, and at a number of major companies, e.g., General Motors of Canada, Dornier, and Aérospatiale. The application at the Xerox Corporation is particularly noteworthy: postediting has been virtually eliminated by controlling the input language of technical manuals for translation from English into a large number of languages (French, German, Italian, Spanish, Portuguese, and Scandinavian languages).

Another long-established commercial system is that of the Logos Corporation, directed by Bernard E. Scott. This company's first effort in MT was an English–Vietnamese system for translating aircraft manuals during the 1970s. Experience gained in this ultimately short-term project was applied in the development of a German–English system which appeared in 1982. Subsequently, Logos has expanded to other language pairs, notably English–French systems for Canadian translation services. Initially, Logos systems were based on a direct translation approach; later systems are closer to a transfer design and incorporate sophisticated means for recording and applying semantic features.

Mainframe systems like Systran and Logos are, in principle, systems designed for general application, although in practice their dictionaries are adapted for particular subject domains, such as nuclear energy or aircraft engineering. Systems specifically designed for a particular environment were also developed during the 1970s and 1980s. The Pan American Health Organization in Washington built two mainframe systems, one for Spanish into English (SPANAM, basically a direct system), the other for English into Spanish (ENGSPAN, a transfer system). Both were developed by just two researchers, Muriel Vasconcellos and Marjorie León—showing what can be achieved with limited resources using well-tested and reliable techniques.

Large tailor-made systems are the speciality of the Smart Corporation (New York). Customers have included Citicorp, Ford, and largest of all, the Canadian Department of Employment and Immigration. The principal feature of Smart systems is (as at Xerox) strict control of SL vocabulary and syntax. Texts are written in restricted English (interactively at terminals); manuals are clear and unambiguous, and translation is regarded as almost a by-product.

During the 1980s the greatest commercial activity was in Japan, where most of the computer companies developed software for computer-aided translation, mainly for the Japanese–English and English–Japanese market, although they did not ignore the needs for translation to and from Korean, Chinese, and other languages. Many of these systems are low-level direct or transfer systems with analysis limited to morphological and syntactic information and with little or no attempt to resolve lexical ambiguities. Often restricted to specific subject fields (computer science and information technology are popular choices), they rely on substantial human assistance at both the preparatory (pre-editing) and the revision (post-editing) stages. Examples are systems from Oki (PENSEE), Mitsubishi (MELTRAN), Sanyo, Toshiba (AS-TRANSAC), Hitachi (HICATS), and Fujitsu (ATLAS). Japanese input demands considerable pre-editing, but it is acceptable to operators of Japanese word processors who have to interpret Japanese script, with two vernacular alphabets (hiragana and katakana), Chinese characters, no capitals, and no indicators of word boundaries. As a consequence, however, good knowledge of Japanese is essential for usable results from Japanese–English systems.

The most sophisticated commercially available system during the 1980s was, however, the METAL German–English system, which had originated from research at the University of Texas. After its interlingua experiments this group adopted an essentially transfer approach, with research supported since 1978 by the Siemens company in Munich (Germany). The METAL system, intended for translation of documents in the fields of data processing and telecommunications, appeared in 1988 and has been followed in the early 1980s by systems involving Dutch, French and Spanish, as well as English and German.

Some of the Japanese systems were designed for microcomputers, but they were not the first. The earliest came from the USA at the beginning of the 1980s. Often linguistically crude, but sometimes capable of providing economically viable results, microcomputer systems have secured for MT a higher public profile than the mainframe systems had done. Most have been rightly marketed not as full MT systems but as computer aids for translators. Earliest were the American Weidner and ALPS systems, which became commerically available in 1981 and 1983 respectively. The ALPS system offered three levels of assistance: multilingual word-processing, automatic dictionary and terminology consultation, and interactive translation. In the latter case, translators could work with MT-produced rough drafts. However, the ALPS products were not profitable, and from the mid-1980s onwards the company diverted into providing a translation service rather than selling computer aids for translators. The Weidner (later World Communications Center) systems proved to be more successful commercially, offering translation packages for a large number of language pairs, with its Japanese–English systems being particularly popular. One version, MICROCAT, was intended for small personal computers, and the other, MACROCAT, for larger machines. In the late 1980s Weidner was acquired by Bravice and shoftly afterwards the MACROCAT version was sold to the Intergraph Corporation. By this time, other systems for personal computers had come onto the market (PC-Translator from Linguistic Products, GTS from Globalink and the Language Assistant series from MicroTac), which were to have a major impact in the next decade.

7. Research in the 1980s

Research from the mid-1970s had three main strands: first, the development of advanced transfer systems building upon experience with earlier interlingua systems; second, the development of new kinds of interlingua systems; and third, the investigation of Artificial Intelligence (AI) techniques and approaches.

After the failure of its interlingua system, the Grenoble group (now GETA, Groupe d'Etudes pour la Traduction Automatique) began development of its Ariane system. Regarded as one of the most advanced linguistics-based transfer systems, Ariane influenced projects throughout the world in the 1980s. Of particular note are its flexibility and modularity, its powerful tree-transducers, and its conception of static and dynamic grammars. Different levels and types of representation (dependency, phrase structure, logical) can be incorporated on single labeled tree structures and thus provide considerable flexibility in multilevel transfer representations. GETA has been particularly prominent in the encouragement of international collaboration and in the training of MT researchers, particularly in South-East Asia. Ariane as such did not become an operational system (despite hopes in the mid-1980s from its involvement in the French national project Calliope) and active research on the system ceased in the late 1980s. It was tested thoroughly by B'VITAL and became part of the Eurolang project in the 1990s, while the Grenoble team has continued MT research on other lines (see Sect. 10 below).

Similar in conception to the GETA–Ariane design has been the Mu system developed at the University of Kyoto under Makoto Nagao. Prominent features of Mu are the use of case grammar analysis and dependency tree representations, and the creation of a programming environment for grammar writing (GRADE). The Kyoto research has influenced many subsequent Japanese research projects and many of the Japanese commercial systems already mentioned. Since 1986, the research prototype has been developing into an operational system for use by the Japanese Information Center for Science and Technology for the translation of abstracts.

Experimental research at Saarbrücken began in 1967, and from the mid 1970s until the late 1980s the group developed SUSY, a highly modular multilingual transfer system displaying an impressive heterogeneity of linguistic techniques: phrase structure rules, transformational rules, case grammar and valency frames, dependency grammar, and variety of operation types: rule-driven, lexicon-driven, table-driven, the use of statistical data, preference rules, etc. Its main achievement was the in-depth treatment of inflected languages such as Russian and German, but many other languages were investigated, particularly English. Other projects include a French–German system (ASCOF) using semantic networks; and the development of a German generator (SEMSYN) to convert output from the Fujitsu ATLAS system in order to translate titles of Japanese scientific articles into German.

One of the best known projects of the 1980s was the Eurotra project of the European Community. Its aim was the construction of an advanced multilingual transfer system for translation among all the Community languages. Its general design owed much to GETA-Ariane and SUSY systems. Like them, it was a linguistics-based modular transfer system intended for multilingual translation producing good quality but not perfect output. The design combined lexical, logico-syntactic and semantic information in multilevel interfaces at a high degree of abstractness. No direct use of extra-linguistic knowledge bases or of interference mechanisms was made, and no facilities for human assistance or intervention during translation processes were to be incorporated. It assumed batch processing and human postediting.

During this period Eurotra stimulated much other innovative theoretical linguistic and computational-linguistic research, particularly in the Netherlands, Belgium, Denmark, Germany and Great Britain. Eurotra researchers advanced substantially the theoretical foundations of MT and made important contributions to syntactic theory, formal parsing theory, and discourse analysis. One of the aims of the Eurotra project was to stimulate such research, and in this it succeeded. However, it did not produce a working prototype, and attempts towards the end of the project to involve industrial partnerships were largely unfruitful. Like Ariane, a major defect, readily conceded by those involved, was the failure to tackle problems of the lexicon, both theoretically and practically. Whereas at the end of the 1970s, Eurotra was seen as representing the best 'linguistics-based' design, at the end of the 1980s it was seen by many as basically obsolete in conception, and by 1992 Eurotra had effectively come to an end.

During the latter half of the 1980s there was a general revival of interest in interlingua systems. Some were small and short-lived, e.g. the ATAMIRI system from Bolivia (primarily for English and Spanish) based on a South American language Aymara. Much more important were projects in the Netherlands, Japan and the USA, some beginning to use knowledge-based methods from research on artificial intelligence.

The DLT (Distributed Language Translation) system at the BSO software company in Utrecht (Netherlands) was a six-year project from 1985 under the general direction of Toon Witkam. It was intended as a multilingual interactive system operating over computer networks, where each terminal was to be a translating machine from and into one language only; texts were to be transmitted between terminals in an intermediary language. As its interlingua, DLT chose a modified form of Esperanto. Analysis was restricted primarily to morphological and syntactic features (formalized in a dependency grammar); there was no semantic analysis of the input. Disambiguation took place in the central interlingua component, where semantico-lexical knowledge was represented in an Esperanto database. From a combination of linguistic and extra-linguistic information the system computed probability scores for pairs of dependency-linked interlingual words. The project made a significant effort in the construction of large lexical databases, and in its final years proposed the building of a Bilingual Knowledge Bank from a corpus of (human) translated texts (Sadler 1989). In a number of respects DLT was a precursor of developments which became more prominent in the 1990s.

A second interlingua project in the Netherlands was innovative in another respect. This was the Rosetta project at Philips (Eindhoven) directed by Jan Landsbergen. The designers of this experimental system, involving three languages (English, Dutch and Spanish), opted to explore the use of Montague grammar in interlingual representations. A fundamental feature was the derivation of semantic representations from the syntactic structure of expressions, following the principle of compositionality; for each syntactic derivation tree there was to be a corresponding semantic derivation tree, and these semantic derivation trees were the interlingual representations. A second feature was the exploration of the reversibility of grammars, a feature of many subsequent MT projects.

MT research in Japan, initially greatly influenced by the Mu project at Kyoto University, has shown a wide variety of approaches. While transfer systems predominate there are also a number of interlingua systems (e.g., the PIVOT system from NEC, now available commercially) and knowledge-based systems (e.g., LUTE at NTT, Lamb at Canon). Japan also launched its own multilingual multinational project in the mid-1980s with participants from China, Indonesia, Malaysia, and Thailand, and the involvement of major Japanese research institutes, including the governmental Electrotechnical Laboratory (ETL) in Tokyo. An ambitious interlingua approach has been adopted with knowledge-based contextual analysis for disambiguation. The project continues to the present day.

Outside North America, Western Europe, and Japan, MT research was also becoming vigorous during the latter half of the 1980s in Korea (sometimes in collaborative projects with Japanese and American groups), in Taiwan (e.g., the ARCHTRAN system), in mainland China at a number of institutions, and in Southeast Asia, particularly in Malaysia. Some of this research has been stimulated by the multilingual multinational project MMT led by the Japanese CICC (Center of the International Cooperation for Computerization), but also more generally it has been driven by commercial expansion particularly in the electronics and computing industries.

Until the end of the decade there was also an increase in activity in the former USSR. The ALPAC report had a negative impact during the 1970s, and a number of advanced MT projects lost support. From 1976 most research was concentrated at the All-Union Centre for Translation in Moscow. Systems for English–Russian (AMPAR) and German–Russian translation (NERPA) were developed based on the direct approach, and although work under the direction of Yurii Apresyan on a more advanced transfer system for French–Russian (FRAP) did continue, most activity was focused on the production of relatively low-level operational systems, often involving the use of statistical analyses.

In the latter part of the 1980s developments in syntactic theory, in particular unification grammar, lexical-functional grammar and government-binding theory, began to attract researchers, although their principal impact was to come in the 1990s. At the time, many observers believed that the most likely source of techniques for improving MT quality was research on natural language processing within the context of artificial intelligence (AI). Investigations of

AI methods in MT research began in the mid-1970s with Yorick Wilks' work on 'preference semantics' and 'semantic templates.' Further inspiration came from the research of Roger Schank at Yale University, and particularly from the development of expert systems and knowledge-based approaches to text 'understanding.'

A number of projects applied knowledge-based approaches, particularly the use of knowledge banks, some in Japan (e.g., the ETL research for the Japanese multilingual project), others in Europe (e.g., at Saarbrücken and Stuttgart), and many in North America. The most important research has been undertaken at Carnegie–Mellon University in Pittsburgh which under the leadership of Jaime Carbonell and Sergei Nirenburg has experimented with a number of knowledge-based MT systems since the mid-1980s to the present time. The methodology is described as 'meaning-oriented MT in an interlingua paradigm.' A working prototype for English and Japanese in both directions was designed for the translation of personal computer manuals. The basic components included a small concept lexicon for the domain, analysis and generation lexicons for the two languages, a syntactic parser with semantic constraints, a semantic mapper (for semantic interpretation), an interactive 'augmentor,' a semantic generator producing TL syntactic structures with lexical selection, and a syntactic generator for producing target sentences. The concept lexicon and the semantic information in the analysis and generation lexicons (i.e., defining semantic constraints) are language-independent but specific to the domain. The core of the system is the interlingual representation of texts, in the form of networks of propositions. They are derived from the processes of semantic analysis and of interactive disambiguation performed by the 'augmentor' by reference to the domain knowledge of the 'concept lexicon.' By the end of the 1980s, the Carnegie–Mellon team had fully elaborated its KANT prototype system and was ready to develop an operational knowledge-based system (see Sect. 9 below.)

8. Corpus-based MT Research since 1989 to the Present

The dominant framework of MT research until the end of the 1980s was based essentially on linguistic rules of various kinds: rules for syntactic analysis, lexical rules, rules for lexical transfer, rules for syntactic generation, rules for morphology, etc. The rule-based approach was most obvious in the dominant transfer systems (Ariane, METAL, SUSY, Mu and Eurotra), but it was at the basis of all the various interlingua systems, both those which were essentially linguistics-oriented (DLT and Rosetta) and those which were knowledge-based (KANT).

Since 1989, however, the dominance of the rule-based approach has been broken by the emergence of new methods and strategies which are now loosely called 'corpus-based' methods. First, a group from IBM published in 1988 the results of experiments on a system based purely on statistical methods. The effectiveness of the method was a considerable surprise to many researchers and has inspired others to experiment with statistical methods of various kinds in subsequent years. Second, at the very same time, certain Japanese groups began to publish preliminary results using methods based on corpora of translation examples, i.e., using the approach now generally called 'example-based' translation. For both approaches the principal feature is that no syntactic or semantic rules are used in the analysis of texts or in the selection of lexical equivalents.

The most dramatic development has been the revival of the statistics-based approach to MT in the Candide project at IBM. Statistical methods were common in the earliest period of MT research, in the 1960s (see Sect. 3 above), but the results had been generally disappointing. With the success of newer stochastic techniques in speech recognition, the IBM team at Yorktown Heights began to look again at their application to MT. The distinctive feature of Candide is that statistical methods are used as virtually the sole means of analysis and generation; no linguistic rules are applied. The IBM research is based on the vast corpus of French and English texts contained in the reports of Canadian parliamentary debates (the Canadian Hansard). The essence of the method is first to align phrases, word groups and individual words of the parallel texts, and then to calculate the probabilities that any one word in a sentence of one language corresponds to a word or words in the translated sentence with which it is aligned in the other language. What surprised most researchers (particularly those involved in rule-based approaches) was that the results were so acceptable: almost half the phases translated either matched exactly the translations in the corpus, or expressed the same sense in slightly different words, or offered other equally legitimate translations. Obviously, the researchers have sought to improve these results, and the IBM group proposes to introduce more sophisticated statistical methods, but they also intend to make use of some minimal linguistic information (e.g., the treatment of all morphological variants of a verb as a single word) and the use of syntactic transformations to bring source structures closer to those of the target language.

The second major 'corpus-based' approach—also benefiting from improved rapid access to large databanks of text corpora—is what is known as the 'example-based' (or 'memory-based') approach. Although first proposed in 1984 by Makoto Nagao, it was only towards the end of the 1980s that experiments began, initially in some Japanese groups and during the DLT project (as already mentioned). The underlying hypothesis is that translation often involves the finding or recalling of analogous examples, i.e., how a particular expression or some similar phrase has been translated before. The example-based approach is founded on processes of extracting and selecting equivalent phrases or word groups from a databank of parallel bilingual texts, which have been aligned either by statistical methods (similar perhaps to those used by the IBM group) or by more traditional rule-based morphological and syntactic methods of analysis. For calculating matches, some MT groups use semantic methods, e.g., a semantic network or a hierarchy (thesaurus) of domain terms. Other groups use statistical information about lexical frequencies in the target language. The main advantage of the approach is that since the texts have been extracted from databanks of actual translations produced by professional translators there is an assurance that the results will be accurate and idiomatic.

The availability of large corpora has encouraged experimentation in methods deriving from the computational modeling of cognition and perception, in particular research on parallel computation, neural networks or connectionism. In natural language processing, connectionist models are 'trained' to recognise the strongest links between grammatical categories (in syntactic patterns) and between lexical items (in semantic networks). The potential relevant to MT is clear enough for both analysis and transfer operations, given the difficulties of formulating accurate grammatical and semantic rules in traditional approaches. As yet, however, within MT only a few groups have done any research in this framework.

Connectionism offers the prospect of systems 'learning' from past successes and failures. So far the nearest approach has been for systems to suggest changes on the basis of statistical data about corrections made by users, e.g., during postediting. This model is seen in the commercial Tovna system and in the experimental PECOF 'feedback' mechanism in the Japanese MAPTRAN system. A similar mechanism has been incorporated in the NEC PIVOT system.

9. Rule-based Systems since 1990

Although the main innovation since 1990 has been growth of corpus-based approaches, rule-based research continues in both transfer and interlingua systems. For example, a number of researchers involved in Eurotra have continued to work on the theoretical approach developed, e.g., the CAT2 system at Saarbrücken, and one of the fruits of Eurotra research has been the PATRANS transfer-based system developed in Denmark for Danish–English translation of patents.

In a rather different form, both theoretical foundations of Ariane and Eurotra survive in the Eurolang project which is based at SITE, a French company which had purchased B'VITAL, the Grenoble company founded to develop Ariane in the French National MT project Calliope. The Eurolang project involves also the German company Siemens-Nixdorf which contributes its transfer-based METAL system. Eurolang is developing ten language pairs: English into and from French, German, Italian and Spanish, and French into and from German. However, the first product of Eurolang has not been an MT system as such but a translator's workstation, the Optimizer, which incorporates an MT module (not just for METAL but also for the Logos systems).

The most important other work on the linguistics-based transfer approach is the research continuing on the LMT project which began under Michael McCord in the mid-1980s, and which is based at a number of IBM research centres in Germany, Spain, Israel and the USA. In LMT, translation is via four steps implemented in PROLOG: (i) lexical analysis, producing descriptions of input words and their transfers; (ii) syntactic analysis of source texts, producing representations of both surface and deep (logical) relations; (iii) transfer, involving both isomorphic structural transfer and restructuring transformations; and (iv) morphological generation of target texts. LMT is characterized as combining a lexicalist approach to grammar and logic programming—LMT stands for 'Logic programming MT.' The language pairs under investigation include English–German, German–English, and English–Spanish. In 1994 the LMT programs were marketed as modules for the IBM computer-based workstation TranslationManager/2.

The interlingua approach thrives with greater vigor, even with the end of the DLT and Rosetta projects. The leading group at Carnegie–Mellon University continues with its knowledge-based approach (Nirenburg et al. 1992), developing several models over the years. In 1992, it announced the beginning of a collaborative project with the Caterpillar company with the aim of creating a large-scale high-quality system CATALYST for multilingual translation of technical manuals in the specific domain of heavy earth-moving equipment. This system combines the knowledge-based approach with controlled input. Examples of other interlingua-based systems are the ULTRA system at the New Mexico State University, and the UNITRAN system based on the linguistic theory of Principles and Parameters (Dorr 1993), which has shown that the application of abstract theory, albeit in a small-scale project, can raise significant issues for MT research in the area of lexicon construction. There is also the Pangloss project, an interlingual system restricted to the vocabulary of mergers and acquisitions, a collaborative project involving experts from the universities of Southern California, New Mexico State and Carnegie–Mellon. Pangloss is itself one of three MT projects supported by ARPA, the others being the IBM statistics-based project mentioned above, and a system being developed by Dragon Systems, a company which has been particularly successful in speech research but with no previous experience in MT. The restitution of US government support for MT research signals perhaps the end of the damaging impact of the ALPAC report (see Sect. 4 above).

Since the mid-1980s there has been a general trend towards the adoption of 'unification' and 'constraint-based' formalisms (e.g. lexical-functional grammar, head-driven phrase structure grammar, categorical grammar, etc.). In 'second generation' rule-based systems (such as Eurotra and Ariane) there were series of complex multi-level representations and large sets of rules for the transformation, mapping and testing of labeled tree representations. Many rules applied only in very specific circumstances and to specific representations, i.e., grammars and transduction rules defined the 'constraints' determining transfer from one level to another and hence from SL text to TL text. The introduction of the unification and constraint-based approaches has led to the simplification of the rules (and hence the computational processes) of analysis, transformation and generation. Now, there are monostratal representations and a restricted set of abstract rules, with conditions and constraints incorporated into specific lexical entries. At the same time, the components of these grammars are in principle reversible, so that it is no longer necessary to construct for the same language different grammars of analysis and generation.

Much of this research has not focused directly on MT as such but on the development of general-purpose systems for natural language processing based on unification and constraint-based grammars. Some of these have been applied to translation tasks; e.g., the Core Language Engine system has been used for translation from Swedish into English and vice versa; the PLNLP (Programming Language for Natural Language Processing) system has provided the foundation for translation systems involving English, Portuguese, Chinese, Korean and Japanese; and the ELU engine (Environnement Linguistique d'Unification) developed at Geneva in Switzerland has formed the basis for a bidirectional system for translating avalanche bulletins between French and German.

The syntactic orientation which characterized transfer systems in the past has thus been replaced by 'lexicalist' approaches, with a consequential increase in the range of information attached to the lexicon: not just morphological and grammatical data and translation equivalents, but also information on syntactic and semantic constraints, and non-linguistic and conceptual information. The expansion of lexical data is seen most clearly in the lexicons of interlingua-based systems, which include large amounts of non-linguistic information. Many groups are investigating and collaborating on methods of extracting lexical information from readily available lexicographic sources, such as bilingual dictionaries intended for language learners, general monolingual dictionaries, specialized technical dictionaries, and the terminological databanks used by professional translators. A notable effort in this area is the Electronic Dictionary Research project, which began in the late 1980s with support from several Japanese computer manufacturing companies.

10. New Areas of Research in the 1990s

One consequence of developments in example-based methods has been that much greater attention is now paid to questions of generating good quality texts in target languages than in previous periods of MT activity when it was commonly assumed that the most difficult problems concerned analysis, disambiguation and the identification of the antecedents of pronouns. In part, the impetus for this research has come from the need to provide natural language output from databases, i.e., translation from the artificial and constrained language used to represent database contents into the natural language of database users. Some MT teams have researched multilingual generation (e.g., in Montreal, for marine forecasts and summaries of statistical data on the labor force). More directly, research has been motivated by the recognition of a demand for types of translations which have not previously been studied. Since 1990, various groups (at UMIST in Manchester, the University of Brussels, Grenoble University and the Science University of Malaysia) have experimented with 'dialog-based MT' systems where the text to be translated is composed or written in a collaborative process between man and machine. In this way it is possible to construct a text which the system is known to be capable of translating without further reference to an author who does not know the target language, who cannot revise the output, and therefore needs assurance of good quality output. The most obvious application is the fairly standardized messages of business communication.

Probably the most significant development of the last five years has been the growing interest in spoken language translation, with the challenge of combining speech recognition and linguistic interpretation of conversation and dialog. A small-scale experiment was conducted at British Telecom in the late 1980s, using a pattern-matching approach to translate a small set of standard business phrases from English into French and vice versa. More significant has been the Japanese project at ATR Interpreting Telecomunications Research Laboratories (based at Nara, near Osaka), which began in 1986 and is funded until the end of the century. The team is developing a system for telephone registrations at international conferences and for telephone booking of hotel accommodation.

Carnegie–Mellon has also experimented with a spoken language translation in its JANUS project during the late 1980s, and since the early 1990s the University of Karlsruhe has been involved in an expansion of JANUS. In 1992, these groups began collaboration with ATR in C-STAR (Consortium for Speech Translation Advanced Research), and in January 1993 gave a successful public demonstration of telephone translation from English, German and Japanese into each of the three languages, within the limited domain of conference registrations. Recently the consortium has added further groups in France (LMSI), the United Kingdom (SRI) and in North America and Asia. Another English–German–Japanese system under development is the German-funded Verbmobil project, which began in May 1993. This 8–10 year project aims to develop a transportable aid for face-to-face English language commerical negotiations by Germans and Japanese who do not know English fluently.

A distinctive feature of the last decade has been the globalization of MT research. Within the last five years, research activity has grown rapidly in China, Taiwan, Korea, India and Southeast Asia. By contrast, MT research in Eastern Europe has been affected profoundly by the political changes since 1989. In many cases, researchers have successfully joined collaborative projects with Western European groups, e.g., researchers from the Czech Republic and from Bulgaria, others have been able to continue only at a much reduced level, particularly researchers from the former USSR, although the important research under Jurij Apresyan continues on the Russian–English ETAP system.

11. Operational Systems since 1990

The use of MT accelerated in the 1990s. This increase has been most marked in commercial agencies, government services and multinational companies, where translations, primarily of technical documentation, are produced on a large scale. This is the major market for the mainframe systems: Systran, Logos, METAL, and ATLAS. All have installations where translations are being produced in large volumes. Indeed, it has been estimated that in 1993 over 300 million words a year were translated by such services: for example, one Logos operation alone (at LexiTech, Canada) was translating annually more than 25 million words of technical manuals.

In these companies, the operators are often not the traditional professional translators, for whom perhaps earlier MT systems were intended. Before the 1980s it was often assumed that the aim of MT research was the (partial) replacement of human translation. Now the aim is focused on special domain-restricted mass-volume systems and on systems for nontranslators, areas where professional translators have not been active. It is quite clear from recent developments that what the professional translators need are tools to assist them: provision of access to dictionaries and terminological databanks, multilingual word processing, management of glossaries and terminology resources, and input/output communication (e.g., OCR scanners, electronic transmission, high-class printing). For these reasons, the most appropriate and successful developments of the early 1990s have been the translator workstations (e.g., IBM's TranslationManager, the TRADOS TWB, the STAR Transit systems, and the Eurolang Optimizer, and PTT from the Canadian Translation Services). MT research has contributed to their development most significantly through the statistical research on bilingual text alignment, e.g., at AT&T Bell Laboratories (Murray Hill, NJ) and Centre d'Innovations en Technologies de l'Information (Montreal), which has enabled translators to store and access previous translations for their later (partial) reuse or revision or as sources for examples of translations. This facility is known generally as 'translation memory.'

A notable impetus has been the requirements of large computer software companies which sell in international markets. Both the software itself and its accompanying documentation must be translated quickly and accurately into the local language if companies are to maintain competitive advantage. Organizations set up to provide the 'localization' and 'globalization' of computer products are major users of MT systems and translation workbenches adapted and designed for their particular needs.

At the same time as the large MT systems are being used more widely, there has been an even more rapid growth in the use and availability of systems for personal computers. Several Japanese companies now market MT systems for microcomputers (e.g., Toshiba, Nova, Sharp, Hitachi, Mitsubishi, NEC, NTT, Oki, Brother, Catena), many for both IBM-compatibles and Apple Macintosh machines. In the United States systems for personal computers are becoming very popular, in particular the systems from Globalink and MicroTac (recently merged in a single company) and PC-Translator—all first appearing in the late 1980s—and each now offering a wide variety of language pairs. Others have joined them, e.g., Finalsoft, Toltran, LogoVista, Winger—the latter a system originally developed in Denmark for a specific client. The growth is not confined to the USA and Japan: there are PC systems from Korea, Taiwan, China, Finland (Kielikone) and Russia (PARS and STYLUS). In face of this competition, producers of the older systems designed for mainframes are now beginning to downsize their products for personal computers. For example, Fujitsu have marketed a version of ATLAS, and Systran has launched a PC version of its software. This trend will undoubtedly accelerate.

A further feature of the 1990s is the increasing availability of MT on telecommunications networks. First in this field was Systran when it gave access in the mid-1980s to its systems over the French Minitel network. It followed by providing network access to subscribers in the USA, and similar access is available in Europe to the versions of Systran developed for the Commission of the European Communities. More recently, the CompuServe network has launched a translation service for its members founded upon the DP/Translator system from Intergraph; and Globalink has announced a similar service on Internet.

At the same time, the development of systems for specific subject domains and users has also expanded rapidly in recent years, often with controlled languages and based on specific sublanguages. Some of these systems have been developed for software companies for individual clients. For example, Volmac Lingware Services has produced MT systems for a textile company, an insurance company, and for translating aircraft maintenance manuals; Cap Gemini Innovation developed TRADEX to translate military telex messages for the French Army; in Japan, CSK developed its own ARGO system for translation in the area of finance and economics, and now offers it also to outside clients; and in Denmark, a similar history lies behind the commercial development of the Winger system. User-designed systems are a sign that the computational methods of MT are now becoming familiar outside the limited circles of researchers. Though rarely innovative from a theoretical viewpoint, they are often computationally advanced.

As the 1990s progress it has become clear that different types of MT systems are required to meet widely differing translation needs. Those identified so far include the traditional MT systems for large organizations, usually within a restricted domain; the translation tools and workstations (with MT modules as options) designed for professional translators; the cheap PC systems for occasional translations; the use of systems to obtain rough gists for the purposes of surveillance or information gathering; the use of MT for translating electronic messages; systems for monolinguals to translate standard messages into unknown languages; and systems for speech translation in restricted domains. It is equally clear that as MT systems of many varieties become more widely known and used, the range of possible translation needs and possible types of MT systems will also become wider and stimulate further research and development, quite probably in directions not yet envisioned.

Bibliography

The general history of MT is covered by Hutchins (1986), updated by Hutchins (1988, 1993, 1994) where full references for the systems and projects mentioned will be found. Basic sources for the early period are Locke & Booth (1955), Booth (1967) and Bruderer (1982). For the period after ALPAC (1966) there are good descriptions of the major MT systems in Slocum (1988), Nirenburg (1987) and King (1987), while details of later systems will be found in the proceedings of the latest biennial MT Summit conferences (Washington 1991, Kobe 1993) and of the conferences on Theoretical and Methodological Issues in Machine Translation (TMI, at Montreal 1992, and Kyoto 1993. Newton (1992), Vasconcellos (1988) and the Aslib conferences (since 1979) provide the wider perspectives of commercial developments and translators' experiences. For general introductions see the books by Lehrberger & Bourbeau (1988), Nagao (1989), Hutchins & Somer (1992), and Arnold et al. (1994).

ALPAC 1966 *Language and Machines: Computers in Translation and Linguistics*. A report by the Automatic Language Processing Advisory Committee. National Academy of Sciences, Washington, D.C.

Arnold D, et al. 1994 *Machine Translation: An Introductory Guide*. NCC/Blackwell, Manchester

Aslib 1979– *Translating and the Computer*. Aslib, London

Bar-Hillel Y 1960 The present status of automatic translation of languages. *Advances in Computers* **1**: 91–163

Booth A D (ed.) 1967 *Machine Translation*. North-Holland, Amsterdam

Bruderer H E (ed.) 1982 *Automatische Sprachübersetzung*. Wissenschaftliche Buchgesellschaft, Darmstadt

Dorr B J 1993 *Machine Translation: A View from the Lexicon*. MIT Press, Cambridge, Massachusetts

Hutchins W J 1986 *Machine Translation: Past, Present, Future*. Ellis Horwood, Chichester

Hutchins W J 1988 Recent developments in machine translation: A review of the last five years. In: Maxwell D, Schubert K, Witkam T (eds.) *New Directions in Machine Translation*. Foris, Dordrecht

Hutchins W J, Somers H L 1992 *An Introduction to Machine Translation*. Academic Press, London

Hutchins W J 1993 Latest developments in machine translation technology. In: *MT Summit* **4**: 11–34

Hutchins W J 1994 Research methods and system designs in machine translation: A ten-year review, 1984–1994. In: *Machine Translation, Ten Years On, 12–14 November 1994* (Cranfield University)

King M (ed.) 1987 *Machine Translation Today: The State of the Art*. Edinburgh University Press, Edinburgh

Lehrberger J, Bourbeau L 1988 *Machine Translation: Linguistic Characteristics of MT Systems and General Methodology of Evaluation*. Benjamins, Amsterdam

Locke W N, Booth A D (eds.) 1955 *Machine Translation of Languages*. MIT Press, Cambridge, Massachusetts

MT Summit 1991 *MT Summit III, July 1–4 1991* (Washington, D.C.)

MT Summit 1993 *MT Summit IV: International Cooperation for Global Communication, July 20–22 1993* (Kobe)

Nagao M 1989 *Machine Translation: How Far Can It Go?* Oxford University Press, Oxford

Newton J (ed.) 1992 *Computers in Translation: A Practical Appraisal*. Routledge, London

Nirenburg S (ed.) 1987 *Machine Translation: Theoretical and Methodological Issues*. Cambridge University Press, Cambridge

Nirenburg S, et al. 1992 *Machine Translation: A Knowledge-based Approach*. Morgan Kaufmann, San Mateo, California

Sadler V 1989 *Working with Analogical Semantics: Disambiguation Techniques in DLT*. Foris, Dordrecht

Slocum J (ed.) 1988 *Machine Translation Systems*. Cambridge University Press, Cambridge

TMI 1992 *Fourth International Conference on Theoretical and Methodological Issues in Machine Translation of Natural Languages. Empiricist vs Rational Methods in MT, June 25–27 1992* (Montreal)

TMI 1993 *Fifth International Conference on Theoretical and Methodological Issues in Machine Translation of Natural*

Languages. MT in the Next Generation, July 14-16 1993 (Kyoto)
Vasconcellos M (ed.) 1988 *Technology as Translation Strategy*. State University of New York, Binghampton, New York
Weaver W 1955 Translation. In: Locke W N, Booth A D (eds.) 1955
Yngve V H 1964 Implications of mechanical translation research. *Proceedings of the American Philosophical Society* **108**: 275–81

Machine Translation in North America

Winfield Scott Bennett

1. The Period 1947–66

In a very real sense machine translation (MT) was born in North America, although the concept is really transatlantic, the result of the collaboration of two people: Warren Weaver in the USA and Andrew D. Booth in the UK. The first suggestion of using electronic computers to translate human language arose in the course of a discussion between Weaver and Booth in New York in 1947, although there are some claims that the idea can be traced to 1946. Alan Turing had also imagined that computers could be used for translation, as he indicated in his report for the National Physical Laboratory in 1948.

Weaver had had experience with the new computer technology during World War II when he worked with computers in cryptography. In March 1947, he wrote a memorandum to Norbert Wiener at the Massachusetts Institute of Technology suggesting that computers could be used for translation; Wiener was unreceptive to the idea. Weaver then contacted Booth who had had similar ideas for computer translation. The impetus for machine translation came from a memorandum Weaver wrote on July 15, 1949, to some 200 of his acquaintances proposing the possibility of computer translation of human language. Weaver conceived of the problems of machine translation as similar to those for computer cryptography. Although some of Weaver's views were certainly naive, his memorandum is significant, in that it essentially launched MT as a field of research not only in the USA, but also in the world.

In the two years following Weaver's memorandum, machine translation research was begun at a number of places: the Massachusetts Institute of Technology (MIT), the University of Washington, the University of California at Los Angeles (UCLA), the US National Bureau of Standards in Los Angeles, and the RAND Corporation in Santa Monica, California. This early work was almost entirely devoted to studying word-for-word translation. In January 1950, Erwin Reifler, a sinologist at the University of Washington, circulated mimeographed copies of his *Studies in Mechanical Translation*, no. 1, a series of studies in MT, which, among other things, introduced the notions of 'pre-editor' and 'post editor' to the field. These functions were conceived as ways to assist the computer system in producing accurate translation despite the linguistic problems inherent in the translation process. Pre-editors were to prepare texts for translation, including, in one suggestion, marking each word for its grammatical category; post editors were to correct the results of the translation process. As Reifler's work indicates, the linguistic problems for machine translation became apparent very early.

In May 1951, Yehoshua Bar-Hillel became the first person appointed solely for machine translation research, when he was hired by MIT to study the possibilities of and to plan future research in machine translation. By the end of 1951 Bar-Hillel had produced a survey on MT: 'The state of machine translation in 1951' (Bar-Hillel 1951). This report raised a number of issues that are still significant in machine translation research, for example, the role of post editing and the feasibility of fully automatic translation.

The first machine translation conference in the world was organized and presided over by Bar-Hillel at MIT, June 17–20, 1952. This conference was attended by eighteen people, seven of whom were from MIT. Booth was the only person who was not from the USA. Although no formal conclusions came out of the conference, it was agreed that research should proceed in two directions: (a) studies of word frequencies and translations and (b) work on operational analysis of syntax with a view to programming. Proceedings were not published at the time, but the substance of the discussions and a number of the papers were subsequently published. The conference marked the beginning of public awareness of machine translation.

The 1952 conference led to the establishment of a machine translation research effort at Georgetown University by Leon Dostert, who had attended the conference and presented a paper. Dostert intended to approach the problems of machine translation experimentally, rather than theoretically, by developing a small system to see if translation by computer was actually feasible. His approach to the issue heralded what is called the 'empirical' approach to machine translation. In conjunction with IBM, the Georgetown University group put on a demonstration of a small-scale Russian–English system on January 7, 1954. Although the system was quite small and the demonstration used a carefully selected Russian text, this public experiment helped stimulate US government funding for MT research.

In 1954, Harvard University founded a research group under Anthony Oettinger, who in the same year presented the first doctoral dissertation in the field. The Harvard group concentrated on the development of a large-scale Russian–English dictionary to be used in its word-for-word system. Throughout the period of this research at Harvard the group produced a series of important research reports in MT.

In March 1954, the first issue of *Mechanical Translation* was issued, under the editorship of William N. Locke and Victor Yngve, both of MIT. In October 1956 the first international conference was held in Teddington in the United Kingdom, with some 30 people attending from the United States, the United Kingdom, and Canada, and papers from the U.S.S.R.

The period from 1954 into the early 1960s was marked by considerable activity in machine translation, although many of the projects combined such research with other computational issues, for example, information retrieval and automatic indexing. Some of the research groups that had started in the late 1940s and early 1950s continued their work into the 1960s, including the University of Washington (1949–62), RAND Corporation (1950–60), MIT (1951–65), Georgetown University (1952–63), and Harvard University (1954–64). These groups were joined throughout the 1950s by others, including the University of Michigan (1955–62), the University of California at Berkeley (1958–64), the University of Texas at Austin (1958–), Wayne State University (1958–72), Ramo-Wooldridge Corporation (later Bunker-Ramo) (1958–1967), the National Bureau of Standards, again, (1959–1963), IBM Research Center, Yorktown Heights, New York (1958–66), and others. The particular approaches varied considerably from site to site, with some emphasizing research in lexicons over research in structure, whereas others preferred to investigate syntax over dictionary work. The language pairs worked with varied somewhat less; most of the projects dealt primarily with Russian–English, with some exceptions, for example, The University of Texas.

The machine translation research at Georgetown University is among the most notable in the history of this work in the USA. Lasting for some eleven years (1952–63), the project was led by Leon Dostert and included such researchers as Paul Garvin, Michael Zarechnak, Peter Toma, A. F. R. Brown, Ariadne Ljukanov, and Muriel Vasconcellos. The group tried a number of approaches to the problems of MT, including the General Analysis Technique—later called the Georgetown Automatic Translation or simply GAT—which was the basis for much of their later work. Although much of the work focused on Russian–English, other language pairs were employed. The Georgetown project's GAT was installed at EURATOM in Ispra, Italy, and at the Oak Ridge National Laboratory, Oak Ridge, Tennessee, in 1963 and 1964, respectively. The influence and importance of the Georgetown work in machine translation cannot be overstated.

In 1960 a research group for MT of scientific titles was established at the Universidad Nacional Autónoma de México, under the directorship of Sergio F. Beltran. The project started with Russian–Spanish, but later expanded its research into English–Spanish, French–Spanish, German–Spanish, and Italian–Spanish. Much of the work focused on the development of dictionaries. The group continued its work into the late 1960s.

Whereas most research focused on the theoretical issues of machine translation, the idea of commercially viable MT systems was in the minds of some researchers. Notable among those who looked for such commercial applications was Peter Toma, a researcher who had worked on the Georgetown project before starting his own MT company, Computer Concepts, Inc., in 1962. The company's AUTOTRAN Russian–English system became operational in July 1963.

Machine translation work in North America was in a period of considerable optimism for the first decade of its existence. Many projects were well-funded, primarily by the USA government, especially the intelligence and military agencies; researchers were highly confident that solutions to the vexing problems of MT would soon be found. In light of later developments it is now clear that researchers were overoptimistic, underestimating the difficulties involved in the syntax and semantics of natural languages that make the whole task of translating such a challenge.

Yehoshua Bar-Hillel published his *Report on the State of Machine Translation in the United States and Great Britain* in 1959. This report was followed in 1960 by his well-known 'The present status of automatic translation of languages' (Bar-Hillel 1960), which included his assessment of MT in general along with specific comments on research efforts in the USA, Great Britain, the USSR, Italy, and Israel. Bar-Hillel's papers presented a very pessimistic view of machine translation. Of the groups discussed in the USA, only the National Bureau of Standards group (Washington, DC), led by Ida Rhodes, received anything approaching praise; the group at The University of Texas at Austin was mentioned but not assessed.

The most far-reaching part of Bar-Hillel's paper was his claim that the goal of fully automatic high-quality translation (FAHQT) by computer was unattainable. Using his now famous example, *the box was in the pen*, Bar-Hillel reasoned that no software or program available at that time or in the future could disambiguate such a sentence or any like it. In his view MT researchers should strive for either fully automatic, low-quality translation or partly automatic, high-quality translation. Bar-Hillel's views convinced a number of people that machine translation was not viable. His influence on MT is still felt in the late twentieth century, although there have been notable achievements in the resolution of the issues his papers raised.

Although Bar-Hillel's reports had significant influence on people outside of the MT research community, he had little influence on the MT community itself. The reports did have the effect of polarizing the MT researchers into two camps: those who had FAHQT as a goal and therefore felt the need to defend their position, and those who did not have FAHQT as a goal and generally ignored Bar-Hillel's position. The unfortunate result of these responses to Bar-Hillel's paper was that the real shortcomings of machine translation did not get addressed.

In spite of Bar-Hillel's views the machine translation community continued to work on various approaches to the problems associated with computer translation of natural language. Whereas earlier systems had focused on the lexicon as the basis for the system, from 1960 on researchers focused more and more on syntax. A number of approaches to syntax were examined, including use of Chomsky's formal grammar by the MIT group and the stratificational approach proposed by Sydney Lamb. Such approaches influenced the later approaches to machine translation.

The US House of Representatives Committee on Science and Astronautics compiled a report on MT in 1960. This *Research on Mechanical Translation* report was quite encouraging in its views on the prospects of machine translation and recommended support for the whole variety of MT efforts, from the highly theoretical to the very practical. In effect this report gave MT research in the USA an official approval.

With the widespread interest and efforts in machine translation research, particularly in the USA, there was naturally quite a bit of overlap. There was some cooperation between groups, but closer links were deemed necessary. This situation led to a series of national MT conferences: UCLA, February 1960; Princeton, July 1960; Georgetown, 1961; Princeton, 1962; and Las Vegas, 1965. The Association for Machine Translation and Computational Linguistics (later simply the Association for Computational Linguistics) was formed at the 1962 conference. There is some dispute about the particular value of these conferences, although they clearly represented steps in the evolution of the field.

Machine translation came under attack in 1961 in a book by Mortimer Taube entitled *Computers and Common Sense*. In this book Taube stated the view that MT was impossible, because there seemed to be no real way in which to formalize human language precisely enough for computers. His position was simply that all research in computer translation should cease. The book was generally ignored by MT researchers, but it had a negative effect on the public perception of such research.

In the period of 1962–64 several USA groups were successful in producing operational systems. Both the IBM and the Georgetown systems for Russian–English were installed at USA government sites. Although their output was not of the highest quality, these systems were deemed to be serviceable enough for their purposes and were well-received by the users.

Theoretical work did not fare as well as did the more pragmatic. Researchers such as Oettinger and Yngve published rather pessimistic papers on the possibilities for ever achieving FAHQT. In his 'Implications of Mechanical Translation Research' (*Proceedings of the American Philosophical Society* 1964) Yngve even suggested that machine translation would probably never be able to get beyond the 'semantic barrier.' The situation in 1964 may be viewed as one of many unfulfilled promises for the field, whereas the research enterprise had become 'a multimillion dollar affair' (Bar-Hillel 1960).

A growing lack of confidence in machine translation research led to a request by the director of the National Science Foundation that the National Academy of Sciences set up a committee to study machine translation. The National Academy of Sciences formed the Automatic Language Processing Advisory Committee (ALPAC) in 1964. This committee consisted of seven members from a variety of interested fields. None of the members of the committee, including the two MT specialists, was convinced of the feasibility of machine translation from the outset.

The ALPAC studied the issue of machine translation from a number of standpoints, specifically, existing demand, supply, and cost of translations; demand and availability of human translators; quality of some MT output; and cost of post editing. Their study was generally limited to Russian–English translation. Two experimental and two production systems were evaluated using a specific Russian text.

The conclusions of the ALPAC, published in its report, *Language and Machines: Computers in Translation and Linguistics* (1966) were that funding for MT research should be decreased and funding for computational linguistics increased. Most machine translation researchers at the time believed that the ALPAC report was highly biased and shortsighted. However, the fact remains that much money had been put into machine translation research without a related amount of success. Whatever may be said about the ALPAC report's objectivity, there is no doubt about its effect on machine translation research in the USA and in the world. By 1968 the MT research effort in the USA had been reduced by approximately 70 percent. Funding in the USA, which had amounted to many millions of dollars between 1956 and 1965, had virtually disappeared.

2. The Period 1966–79

Shortly before the ALPAC report was published, the Canadian government began supporting machine translation by funding three projects: one at the University of Saskatchewan, one at the University of Montreal, and one at Cambridge University. All three of the projects were for English–French translation.

The project at the University of Saskatchewan was directed by Kathleen Booth. It started in 1965 and ended in 1972. The system used a direct translation approach with a bilingual dictionary put together using statistical analyses of a 20,000-word corpus. These analyses determined the most probable grammatical categories for English and their most frequent French equivalents. In 1971 the system was tested; the results of the test indicated that the output was usable for post editing.

In 1965 the Canadian Research Council also set up Centre de Traitement Automatisé des Données Linguistiques (CETADOL) at the University of Montreal, under the directorship of Guy Rondeau. CETADOL's initial work focused on problems of natural language processing, English morphology and syntax, and grammatical classification. In 1970 the group was renamed TAUM (Traduction Automatique de l'Université de Montréal); the goal of the newly named group was an operational English–French system. The first prototype for this system was developed under Alain Colmerauer's leadership and work continued on the prototype under the direction of Richard Kittredge until 1977 and the completion of the TAUM-METEO system.

In 1976 the TAUM group had begun work on an MT system for translating weather forecasts. The system, called TAUM-METEO, was delivered in 1977 and was in daily use from then until 1990, when it began to be replaced by a system that automatically generates English and French weather reports from numerical data. TAUM-METEO is easily the most successful machine translation endeavor in the history of the field.

The TAUM group next worked on a project to develop a system for the translation of aircraft maintenance manuals. This project, TAUM-AVIATION, was directed by Marcel Paré throughout its course (1977–1981). TAUM-AVIATION was terminated in 1981, because it was decided that it would never become a cost-effective production system. With the end of the TAUM-AVIATION project, the TAUM group was disbanded.

On the commercial front, Peter Toma continued his work in the development and marketing of production machine translation. In 1968 he formed Latsec, Inc., in La Jolla, California. His AUTOTRAN subsequently gave way to SYSTRAN and SYSTRAN II. SYSTRAN replaced the IBM Mark II system at Wright-Patterson Air Force Base, Dayton, Ohio, in 1969, where it has remained in use ever since. SYSTRAN was also used by the US National Aeronautic and Space Administration (NASA) for the US-USSR Apollo-Soyuz space project (1974–75). SYSTRAN also was used in Europe at EURATOM and later in the European Community. From a single system that could translate from Russian to English, SYSTRAN now consists of a number of language pairs and is installed at a number of international sites, although it is essentially still a direct translation system.

In 1969, Bernard Scott founded the Logos Development Corporation to develop an English–Vietnamese MT system under the sponsorship of the US Air Force. The result of this work was a direct-transfer system, LOGOS I, which combined features from both the direct and transfer approaches to MT. An evaluation of LOGOS I in 1972 indicated that the output was useful once post edited. Subsequently, in the 1970s, Logos Corporation continued its work in machine translation for such pairs as English–Russian (LOGOS II) and English–Persian. Plans for other systems were considered, but not carried out.

The Pan-American Health Organization (PAHO) entered the machine translation business in 1976 when it contracted three consultants, Bedrich Chaloupka, Giuliano Grugnoli, and Allen Tucker, for the development of a Spanish–English machine translation system. Chaloupka, Grugnoli, and Tucker had worked together previously in developing a small-scale Russian–English system at Xonics in 1970–76. Responsibility for the project rested with Muriel Vasconcellos who had been involved with the Georgetown project in the 1950s. In 1979, Marjorie León joined PAHO as a full-time MT researcher. The result of the work was SPANAM, which became operational in 1980. At this stage SPANAM was a direct translation system, seen as a practical approach to the computational translation of all sorts of Spanish language documents.

In a very real way the ALPAC report (1966) reduced interest in the theoretical issues of machine translation in the USA for some time after its publication. All funding was not eliminated however; projects continued at the University of California, Berkeley (until 1975); Wayne State University (until 1972); and at The University of Texas at Austin.

From the standpoint of theoretical research, an important figure in the post-ALPAC era was Zbigniew

L. Pankowicz, a US civil servant at Rome Air Development Center (RADC), who had the vision to see the usefulness of machine translation in spite of the statements in the ALPAC report.

The MT research at the Linguistics Research Center (LRC), The University of Texas at Austin, is the longest running machine translation research effort in the USA. Although work in MT research had begun at The University of Texas in 1959, the LRC was founded in 1961, under the directorship of Winfred P. Lehmann, as a research center for various computational linguistic projects, not just machine translation.

Funding from 1968 to 1970 was somewhat diminished at the LRC, but research continued throughout the period. In 1970, with funding from RADC, work on an interlingual German–English system was begun. The principal researcher for this work was Rolf A. Stachowitz. The system was initially called simply the Linguistics Research System, but this was changed in 1973 to METALS, then METAL. Although there is still some discussion about what this name stands for, the general view is that it is a shortened form of metalinguistics. METAL has been the name for the LRC's machine translation system ever since. The work on an interlingual system was interesting, but not entirely successful and the project was abandoned in 1975.

After a hiatus, research in machine translation began again at the LRC in 1978. RADC again funded a project, this time to investigate the feasibility of an operational machine translation system. This funding was augmented in 1979 by Siemens AG, the German electronics company, which was interested in an operational MT system to translate large volumes of texts. The project manager initially was Jonathan Slocum; Winfield S. Bennett was the primary linguist for the Siemens-sponsored work.

From 1970 to 1974 Yorick Wilks, who previously had been involved in machine translation at the Cambridge Language Research Unit, worked on a prototype English–French system at Stanford University, California. Wilks's system used a semantic grammar and commonsense inference rules, based on semantic formulas in which preferred, rather than obligatory, features were represented. This experimental work at Stanford ended when Wilks returned to Europe in 1974.

In 1970 the Translation Sciences Institute was established at Brigham Young University (BYU), Provo, Utah, under the direction of Eldon G. Lytle. Funding was provided by BYU and the Church of Jesus Christ of Latter-Day Saints (LDS). The goal was to produce an interactive MT system for translating English texts into a wide variety of languages. The analysis was due to be done interactively; the multilingual synthesis automatically. In 1979 the sponsors decided that the system offered little chance of commercial viability and work on ITS itself essentially ceased. However, Alan K. Melby continued to work with the system from the standpoint of workstation design. Melby's work with MT work environments, especially from the standpoint of the user, continues to provide useful and significant information to the machine translation community.

The Weidner Communications Corporation (WCC) was founded in 1977, also in Provo, Utah, as a competitor to the Translation Sciences Institute. This corporation was a completely private enterprise, without funding from either BYU or LDS. The corporation moved its headquarters to Northbrook, Illinois, (near Chicago) in 1982, but left the research group in Provo. Bravice International, a Japanese translation company, became the full owner of WCC (then called World Communications Center) in 1988. WCC's primary goal was the development of computer-aided translation (CAT), rather than automatic systems. The system, which has a number of language pairs, runs either on an IBM PC (MicroCAT) or on a DEC MicroVAX II (MacroCAT). Although WCC is still active in Europe (under the corporate title Weidner Translation Europe Ltd), activities in the USA ceased in the late 1980s.

3. The Period 1980 to the Present

On one hand, splitting a discussion of machine translation in North America at 1980 is artificial because a number of projects that continued into the 1980s actually began in the 1970s or earlier. On the other hand, however, 1980 is a useful boundary because it marks the beginning of a change from the post-ALPAC era to the modern era of MT research.

At the beginning of the decade there were a number of commercial systems either at production stage or under development. On the academic scene there were few projects, the most notable of which was the continuation of work on METAL at The University of Texas at Austin, and the work at Yale.

As stated above, the work on METAL began in 1978 with funding from Rome Air Development Center. This funding was augmented in 1979 by funding from Siemens AG, and since 1980 Siemens has provided all the funding for METAL research. The framework for the system was developed almost entirely at The University of Texas at Austin until 1985; starting in October 1985, the development of parts of METAL framework has been shared among the various METAL sites in Belgium, Germany, Spain, and Denmark, along with work on particular language pairs. METAL is being marketed in Europe currently; there is some promise that it will be marketed in North America in the early 1990s.

Although in its current form METAL uses a transfer approach the system has taken on some characteristics of an interlingual system in the past few years, specifically in the use of a language-independent intermediate representation. METAL is a highly modular system that allows the combination of any of the source language analyses with any of the target language syntheses. METAL is unique in combining theoretical and practical considerations in one system.

From 1978 to 1982 there were two MT projects at Yale University using the conceptual dependency representations developed by Roger Schank. Schank's conceptual dependency representations seek to represent semantic relationships that express not only the surface structure of a string but also other information that is implied in it. In the first project Jaime Carbonell, Richard E. Cullingford, and others developed a basic interlingual system using 'scripts' to translate an accident report. In 1982, Steven L. Lytinen and Roger Schank experimented with machine translation using Memory Organization Packets (MOPS), which were representations of general, rather than specific, situations. The system was called MOPSTRANS.

From the late 1970s, LOGOS has continued development of its MT system, this time using German–English, initially with assistance from Siemens AG. In 1982 Logos Corporation introduced the Logos Intelligent Translation System for German–English; this was followed in 1984 with the introduction of their English–German system. Work is in progress for other language pairs, for example, English–French and German–French. The newer systems use more of a transfer approach than did the earlier direct translation LOGOS systems.

ALPS (Automated Language Processing Systems) was formed in 1980 by Eldon G. Lytle and other people from the BYU Translation Sciences Institute (TSI). Their work was seen as a continuation of the TSI work in interactive machine translation. As it was marketed in 1984, the ALPS system offered the user three possible levels for assistance in translation, ranging from access to the user's own dictionary to interactive translation systems for up to eight language pairs, all involving English as the source or target language. Since 1988, ALPS (now ALPNET) has shifted its emphasis in the machine translation market to providing translation service and translation aids in the form of various packages, for example, Transactive (an interactive translation program), and Translation Support System (a multilingual word processor with a variety of tools for the user). In this they have been most successful.

SYSTRAN has not particularly changed in the 1980s, but has found somewhat wider distribution. Gachot SA has acquired the ownership of SYSTRAN in the USA and Europe, whereas a Japanese company owns the Systran Corporation of Japan. In North America, SYSTRAN remains the MT system of choice for the USAF Foreign Technology Division at Wright-Patterson Air Force Base, Dayton, Ohio; for Xerox; and for General Motors of Canada. It also has a significant market in Europe.

Smart Communications, Inc., founded in the 1970s by John M. Smart, offers an editor, which is designed to assist in technical writing, and a translator, which is designed to translate texts in a restricted source language grammar and lexicon. Without making claims for any particular sophistication, Smart Communications offers tools for multilingual documentation in a variety of subject areas.

Executive Communication Systems, Inc. (ECS), was founded in 1984 to develop natural language software, especially MT software, including an MT tool kit. Until 1989 ECS was owned by Bravice, the Japanese firm that also owned WCC. Their systems use Lexical Functional Grammar (LFG). Over the past six years ECS has worked on a number of MT projects, including a Japanese–English system, an English–Chinese system, bidirectional English–French, English–German, and English–Spanish prototypes, and most recently a bidirectional English–Korean system.

1983 saw the start of a project for the creation of an MT model based on AI called TRANSLATOR at Colgate University (Hamilton, NY). The principal investigators for this project were Allen Tucker and Sergei Nirenburg. TRANSLATOR was an interlingual system that was designed to accommodate pragmatic and discourse–structure information, and to represent the expert knowledge of a human translator.

The machine translation research into knowledge-based systems at Carnegie-Mellon University (CMU) is one of the most significant research projects currently in the field. With Jaime Carbonell as director and Masaru Tomita and Sergei Nirenburg as principal investigators, CMU's Center for Machine Translation is committed to the creation of a functional knowledge-based machine translation (KBMT) system. The KBMT–89 system is interlingual with a knowledge base used to assist in the analysis of the source language. In February 1989, work began on a new system known as DIONYSUS. Although the current work involves primarily English and Japanese, it is conceptually a multilingual system, because the meaning representation of the source language, which is the result of analysis, may be generated into any number of target languages.

In 1982 the Pan-American Health Organization (PAHO) began work on ENGSPAN, its in-house English–Spanish system, with partial support from the US Agency for International Development (USAID). This effort, which represented a major nonmilitary interest in MT, was led by Marjorie León and Muriel Vasconcellos. ENGSPAN became operational in 1984. The system features that were developed for ENGSPAN have since been retrofitted into SPANAM. Both systems have developed considerably since they first became operational and no longer resemble the GAT system, as SPANAM once did. SPANAM and ENGSPAN are in almost daily use, translating documents in a wide variety of subject areas for PAHO. ENGSPAN is installed at USAID, the International Center for Tropical

Agriculture in Colombia, and the International Rice Research Institute in the Philippines.

In the late 1980s, Pierre Isabelle and Elliott Macklovitch began work at the Centre Canadien de Recherches sur l'Informatisation du Travail on CRITTER, a system for English–French and French–English translation of agricultural texts. More than being simply a limited domain MT system, CRITTER is intended to be a testbed for a theoretically well-motivated model for translation. CRITTER is designed to be a reversible system, that is, the single system will handle both English–French and French–English.

Work on an experimental interlingual English–Chinese system, called XTRA, was conducted at New Mexico State University (NMSU) by Xiaming Hŭang. This work was begun at the University of Essex, UK, by Huang and taken by him to NMSU. Huang's system incorporates definite clause grammar, case grammar, and Yorick Wilks's preference semantics.

4. Future Prospects

The interest in machine translation in North America certainly seems to be on the increase. Whereas there was little research in the field at the beginning of the 1980s, there are now several large projects, notably at the LRC (The University of Texas at Austin), and Carnegie-Mellon University, and a number of significant smaller academic projects. Additionally the market for machine translation in North America seems to be opening up, which will stimulate both the development and marketing of existing and future production systems.

Future work on machine translation in North America will certainly focus more and more on semantics, either in semantically driven systems or in semantic components for syntactically driven systems. It is safe to assume that work with knowledge-based systems will continue, as will investigations into AI-based systems. Use of various grammar formalisms in models for machine translation will increase as theoretical linguistics continues to influence the MT community. The computational and linguistic technologies appear to have reached the stage at which production interlingual systems at last seem feasible. Perhaps the only limiting factor is the availability of funding to support a variety of MT research efforts in North America.

Bibliography

Bar-Hillel Y 1951 The state of machine translation in 1951. *American Documentation* **2**: 229–37

Bar-Hillel Y 1960 The present status of automatic translation of languages. *Advances in Computers* **1**: 92–163

Hutchins W J 1986 *Machine Translation: Past, Present, Future*. Halsted, New York

Hutchins W J 1988 Recent developments in machine translation. In: Maxwell, et al. (eds.)

Lehrberger J, Bourbeau L 1988 *Machine Translation: Linguistic Characteristics of MT Systems and General Methodology of Evaluation*. Benjamins, Amsterdam

Maxwell D, Schubert K, Witkam T (eds.) 1988 *New Directions in Machine Translation: Conference Proceedings, Budapest, August 18–19 1988*. Foris, Dordrecht

Nirenberg S (ed.) 1987 *Machine Translation: Theoretical and Methodological Issues*. Cambridge University Press, Cambridge

Subject Index

Abhihitānvaya 68
Ablative absolute, Greco-Roman tradition 89
Ablative case
  early Roman Empire 109
  Varronian linguistics 105–106
Ablaut
  Bloomfield on 299
  historical linguistics 204
Absolute, medieval philosophy of language 140
Absolutio, later Middle Ages grammar 131, 132
Absolutive, case grammar 362
Abstraction(s)
  Ancient Greek grammar 101
  structuralism 225, 226
Accademia della Crusca 150, 155
Accent (stress), Ancient Greek grammar 100
  Apollonius 113
Accents (diacritics)
  introduction, Italian Renaissance linguistics 154
  phonetic notation 390, 392, 393, 394, 395, 398, 399, 400
Accidence, Aristotle 84
Accidents, traditional grammar 134
Accusative case, Ancient Greek grammar 111
Accusative syntax, historical linguistics 207
Acoustics, speech 380–381, 414–415
Actants, valency theory 281–283
Active syntax, historical linguistics 207
Actors
  macrorole 362
  Prague School 256–257
Adamic language 212
Addition
  Ancient Greek grammar 92, 94, 101
    Apollonius 112
    Herodian 114
  early Roman Imperial linguistics 109
  in Greco-Roman tradition 83
Addressees, Prague School 256–257
Adjective phrases, valency grammar 283
Adjectives
  Ancient Greek grammar 94, 95
  cognitive grammar 366
  functions, applicational grammar 348–349
  valency 287–288
  verbal, Ancient Greek 97
Adjunction, transformational grammar 328
Adnectors, applicational grammar 349
Adverbials, valency grammar 281–282
Adverbium 133
Adverbs
  Ancient Greek grammar 95, 96
    Apollonius 112, 113
  Latin, early Roman Empire 108
Adyghe, vowel system 248
Affectivity, spoken language 240
Affixation, American structuralism 298
African languages, writing systems 394
Agent, case grammar 358, 359
Agentives, case grammar 352–353, 358, 359, 360
Agglutinating (agglutinative) languages 197
  typology 213, 215
Agreement
  Ancient Greek grammar 91–92, 94
  French Renaissance linguistics 162
  functional grammar 293, 294
Akattiyam 77
Akkadian, word lists 19–20
Akṣara 72
Akṣara-samāmāya 73, 74
Alcānksā 70
Alexandrian grammar/grammarians 85–86, 87–88
Algebraic notation, typology 214
Algebraic structuralism 227–228
Allegation 258
Allophones, American structuralism 306
Alphabet(s)
  Ancient Greek 90
  invention 83
  Latin, Quintilian 109
  phonetic
    Alphabetic Conference (1854) 394
    Anthropos Alphabet 400–402
    dialect 398
    digraphic 394, 395
    Franklin and 391
    glossic 395
    harmonic 393
    iconic 391, 392, 396
    International Phonetic Association 398, 399
    latinic 395
    machine-readable 401
    organic 392, 397
    palaeotype 395
    panethnic 395
    phonotypic 393
    roman-based 389, 390–392, 394–395
    romic 397
    standard (universal) 391, 392, 394
  reform, French Renaissance linguistics 164
ALPS system (machine translation) 438, 450
Alternation(s) 307
Ambiguity, verbal, Stoics 85
American Bible Union 426
American English, spelling reform 391, 393–394
American languages, native 227
  American structuralism 295–296, 297, 298–299, 301–302
  grammars 151, 158
  Spanish Renaissance linguistics 158
  transcription 394, 400

American structuralism 225, 295–306
  anthropology and 296
  Bloomfield, Leonard 298–303
  Boas, Franz 296–297
  descriptive grammmar 301–303
  distributionalism 303–304
  grammatical forms (taxemes) 299–300
  grammatical processes 298
  interdisciplinary influences 295
  morphemes 299–300, 304
  morphology 300–301
  native American languages 295–296, 297, 298–299, 301–302
  phonology *see* Phonology, American structuralist
  primacy of sentence over word 299
  relativism and 297
  Sapir, Edward 297–298
  Sapir-Whorf hypothesis 297, 298
  syntax 299–301
Analogia 99, 102
  Varronian linguistics 104, 105, 106
    arithmetical proportions 104, 105
Analogy
  Alexandrians 86, 87
  Arabic grammar 29, 30–32
  Herodion 113
  linguistic change 204, 205, 207
  prescriptive 107
  Quintilian 109–110
  Technai 99–100
  Varronian linguistics 87
Analytic languages 213, 214
Anaphora, transitional grammar 336–337
Anastrophe, Quintilian 109
Ancestral language 180
Anglo-Saxon, historical and comparative studies 183–184
Anglo-Saxon Chronicle 183, 184
Anlaut, historical linguistics 204
Anomaly/Anomalies
  papyrus *technai* 99–100
  Varronian linguistics 105
Anthropology
  and American structuralism 296
  emic/etic 319
  linguistic palaeontology 210
  and linguistics 223, 225
Antipassives, Guillaumian linguistics 279
Antiquity, Quintilian 109–110
Anubandha, markers 68
Anusvara 75
Anvitābhidhāna theory 68–69
Apollonius Dyscolus 87–88, 111–113, 149
Apostrophe, introduction 154
Appeal (appellative) function, Prague School phonology 252
Appellatio 139, 140
Appellation, properties of terms 139
Applicational grammar 348–352
  background 348
  basic units 348–349
  derivation 349
  levels of category 349
  metalanguage formulation 351
  relators 349
  and semantics 350–351
  sentence 348, 350
  situation semantics 350–351
  and typology 351
Arabic
  grammar
    analogy (*qiỵās*) 29, 30–32
    attested data (*sama‘*) 29, 32
    fundamentals (*usul*) 29, 32
    history and development 28–32
    'illa 31
    i'rāb 33
    morphology 32–33
    presumption of continuity (*istish ab al-hal*) 29, 31–32
    Qur'an 29–30
    schools of 32
    syntax (*nahn*) 33–34
    words 33
  lexicography 35–37
  linguistic tradition 28–38
  poetry 30
  pragmatics 35
  Renaissance studies 150, 151
  semantics 35
  words
    aplastic (*jāmid*) 33
    derived (*mushtaqq*) 33
Aramaic, Renaissance studies 150, 151
Arbitariness of signs *see* Signs, arbitrariness
Archaisms, Quintilian 110
Archiphonemes 248
  Ancient Greek grammar 101
  fundamental 248
  neutralization and 251–252
ARCHTRAN (machine translation system) 439
Areal linguistics
  Crocean influence 226
  and historical linguistics 209–210
Areal norms, Neolinguistics 244–245
Ariane (machine translation system) 439
Aristotelian categories, ten 127
Aristotle
  influence in Middle Ages 137–138, 141, 142
    later Middle Ages 130, 131, 134
  on language 84, 93–95, 111
  Organon 137
Ars dictamnis 130
Ars grammatica 87, 88–89, 103, 115–118
  background 115–116
  contrastive linguistics 88, 116
  early Roman Empire 107–110
  enarratio auctorum 107
  first 107, 108, 115
  grammatical commentaries 88–89, 116
  in Greco-Roman tradition 83
  influence in early Middle Ages 122
  quadripertita ratio 88
  ratio loquendi 107
  regulae-type grammars 88
  stylistics 88, 118
    Quintilian 109
  textbooks 115, 116–117
  tradition 117
  vitia virtutesque orationis 87

- *Ars maior* 123, 124
- *Ars minor* 123
  - Christian 122, 123–124
- Articles
  - Ancient Greek grammar 84, 85, 92
    - Apollonius 112
  - definite, Ancient Greek 96
  - Guillaumian linguistics 277, 278
- Articulation
  - double
    - Ancient Greek grammar 92, 101, 112
    - functional grammar 290, 291
    - Graeco-Roman tradition 89
  - manner of *see* Consonants, manner of articulation
  - place of *see* Consonants, place of articulation; Vowels, classification
- Articulatory phonetics
  - history 402–408
  - speech physiology and 402–408
- Artificial Intelligence (AI) and machine translation 439–440
- *Asatti* 70
- Asiatic Society 189, 197
- Aspect
  - Ancient Greek grammar 97
  - Guillaumian linguistics 278
  - Varronian linguistics 106
- Aspirates, phonetic history 374, 375
- Aspiration, Ancient Greek grammar 94
- Assimilation, Ancient Indian phonetics 372
- *Atharvaveda* 74
- ATIMIRI (machine translation system) 439
- *Auctoritas*
  - Quintilian 110
  - Varronian linguistics 106
- Augmented Transition Networks (ATNs), parsing 434
- Auslaut 205
- Automatic Language Processing Advisory Committee (ALPAC), report (1966) 435–446, 447–448
- Automatic speech recognition (ASR), historical antecedents 418–419
- Autonomy
  - syntax 229
  - twentieth century linguistic science 221, 223–224, 232, 239
- Auxiliaries
  - analysis, generative semantics 345
  - transformational analysis 327
- Axiōmatā, Stoic grammar 85

- Babylonian grammatical texts 19–21
- Barbarisms
  - Ancient Greek grammar 83, 94, 99
  - Latin, early Roman Empire 108, 109, 110
- *Baṣran* 32
- Behavior
  - language and 315
  - tagmemics 315
- Behaviorism 225
- Bell, Alexander Melville 384
  - speech sound analysis 384
  - *Visible Speech* 384, 396–397
    - notation 396–397
- Benefactive, case grammar 359
- Bengal, colonialism 189–190
- Bengali script, tables 188
- Berlin Academy of Sciences, origin of language debate 184, 186
- Bi-uniqueness 307, 309, 311
- Bible
  - English
    - Lollard 421
    - medieval 421
    - modern translations 426, 428
  - German 422
  - Hebrew *see* Hebrew, Biblical
  - Latin, 16th century 422
  - linguistic influence, Renaissance 150, 151
  - polyglot 158
  - translation(s)
    - Age of Reason 424
    - ancient 419–420
    - Jewish 419, 428
    - Middle Ages 421
    - missionaries 427
    - nineteenth 426
    - Reformation 422
    - twentieth century 428
    - vernacular 422, 424, 426, 427
    - Wycliffe Bible Translators 228, 426
- Bible Societies 427
  - United 427
- Bilingual Knowledge Bank 439
- Bloomfield, Leonard 225
  - American structuralism 295, 298–303, 304
  - descriptive linguistics 301–303
  - *Introduction to the Study of Language* 299
  - *Language* 299–300
  - *Language of Science* 302
  - phonology 306–307
- Bloomfieldians, American structuralism 295
- *Book of Common Prayer*, translation 422, 428
- Borrowing
  - and linguistic change 245
  - Sanskrit 189, 190
- Boundary signals, phonology 252
- Bourgeois linguistics 227
- Brahmaṇas 66
- Brücke, Ernst (Wilhelm von)
  - acoustic phonetics 414
  - alphabet 396
  - sound physiology 381–382, 402–404
- Buddhism, influence on Chinese phonetics 51, 52

- C-STAR 443
- C-strain, linguistic analysis 213, 214
- Candide machine translation project 440
- Carian 206
- Carnegie-Mellon University (CMU), Center for Machine Translation 440, 441, 442, 450
- Carolingian Renaissance 121
  - grammar teaching 122, 126–129
- Cartesian linguistics, Chomsky and 229
- Cartesian method 169–170, 175
- Case
  - Ancient Greek grammar 83, 92, 94, 95, 111
  - Greco-Roman tradition 84
  - order, Ancient Greek 92

  Stoic grammar 85
  Varronian linguistics 104, 105
Case frames 353, 355, 358
Case government, Ancient Greek grammar 94
Case grammar 352–364
  agentives 352–353
  Fillmorean 229, 353, 356
  fundamentals 352
  lexical 356–358
  neutral case relation 353
  semantic functions 352, 358–359
  thematic roles 358–359
  varieties 356–358
Case relations 352–364
  contrastive status 357
  defining of 358–363
  dependency 358
  functional grammar 356
  hierarchy 353–354
  holistic 355
  inflection and 352–353
  neutral 355
  partitive 355
  place 355
  sytactic role 355
CAT2 (machine translation system) 441
Categorematic terms
  medieval philosophy of language 138, 139, 142
  nouns 139
  supposition and 139
    types 139–140
Categories, Modistic grammar 133
Causatives, valency grammar 286–287
Celtic languages 183
Centre d'Etudes pour la Traduction Automatique (CETA) 436
Cercle Ferdinand de Saussure 241
CETA 436
Change, linguistic
  analogical 204
    historical linguistics 205, 207
  Ancient Greek grammar 93
  areal norms 244–245
  'catastrophic' 205, 208
  causes and mechanics 206–210
  cross-linguistic contacts 209–210
  drift 207, 208
  exceptionless shifts 205
  frequency 200
  general rules 205
  lexical 208
  natural, historical linguistics 207
  Neogrammarians 205
  Neolinguists 245–246
  social factors 208–209
  speed of 208
  systematic correspondences 203–204
  wave theory 204, 245, 246
Chicago Linguistic Society 346
Chinese
  dialect geography 42–43
  dictionaries 42, 43
    rhyme 51
  lexicography 41–42
  linguistic history 41–45
  metalinguistic speculation 41
  phonetics
    Buddhist influences 51, 52
    fân qiè 51
    history 51–53
    palatalization 53
    rhyme in 51, 52–53
  phonology
    du ruo ('read as') method 43
    fân qiè method 43, 46
    historical studies 43–44
    tones 44, 51
  typology 213
  writing systems 41, 42
  Early Middle Chinese 52
  Late Middle Chinese 52
  Mandarin Chinese 53
Chinese characters
  in Japanese 45
  radicals (*bu shou*) 42
  six principles (*liu shu*) 42
    xing sheng 42, 43
  standardization 41–42
  xiao zhuan 41, 42
Chomsky, Noam 228
  Aspects of the Theory of Syntax 330–332
  Government and Binding Theory 229–230
  on Port-Royal grammar theory 176
  Revised Standard Theory 229
  Standard Theory 228–229
  Syntactic Structures 327–328
  on syntax 228
  on transformations 229, 327–328, 330–332
Chomskyan syllogism, comparative linguistics 201
Christianity
  exegesis of Latin texts 121–122
  see also Translation, Christian
Cineradiographic film of speech 413
Circonstants, valency theory 281–283
Circumstantials, case grammar 361, 363
Cladistics, comparative linguistics 199
Classical linguistics 83–90
Classification of language
  physical characteristics of speaker 215
  pure-/mixed-relational 215
  Varronian linguistics 105–106
Classification of languages
  by morphological-syntactic types 214
  genetic 212, 214
  history of 212–216
  mono-/poly-syllabic 212–213
  morphological structure basis 214
  original/compounded 213
  scientific approach 213
  synthetic/analytic 213, 214
  tripartite 214, 215
Clauses
  embedded, valency grammar 288
  glossematics 268
Clefting, valency, predicatives 284
Clicks, notation 394, 400
Clitics, enclitics 201
Coarticulation, experimental phonetics 414

Cognition
  connectionist models 367
  language and 205
  parallel distributed processing 367
Cognitive domains 365
Cognitive grammar 364–368
  categorization 365–366
  construal 365–366
  constructions 367
  grammatical structure 366–367
  organization 364–365
  parallel distributed processing 367
  rules 367
  semantic structure 365–366
  symbolization 365
Cognitive linguistics, stratificational grammar 321
Cognitive roles, Prague School 256–257
Cognitive science
  and comparative linguistics 200
  dependency syntax 278
  Guillaumian linguistics 277, 278
  linguistics 232
Cognitive semantics 365
Cohesion, tagmemes/tagmemics 318
Collocation, as mode of meaning 270–271
Colonialism
  and Sanskrit 189–190
  translation and 427
Color terminology, glossematics 264
COMIT 434
Comment, Prague School 254
Commentaries
  ars grammatica 88–89, 110, 116
  medieval 134
    early 122, 125, 127, 128–129
    later 130–131
Communication
  functions of language, Prague School 254
  in language
    origin of language debate 186
    society and 185, 186
Communicative dynamism, Prague School 257–258, 260
Communicative relevance of languages 290, 290–291
Commutation test
  functional grammar 291, 293
  glossematics 265
Comparative grammar 197
Comparative linguistics
  Britain, early studies 183–184
  Chomskyan syllogism 201
  and contrastive linguistics, distinction 195
  crosslinguistic transitivity study 201
  dissection 198
  drift 201
  forms of grammar 198
  genealogies 195–196, 198
    influence of science 198, 199
  German-speaking lands 179–180
  head study 201–202
  history 195–202, 203
  Italian Renaissance linguistics 152–154
  linguistic geography 200
  Low Countries 181
  macro-derivation 196
  organic theory 198, 199–200
  phonology, strength 201
  polygenesis 199
  regularity of change 200
  Scandinavia 180–181
  science as model 179, 199–200
  tree pattern of language descent 198
  typology 197
Comparative-historical grammar 5
Comparative-strain, linguistic analysis 213, 214
Comparatives
  Ancient Greek grammar 95
  French Renaissance linguistics 163
  Latin, solecisms 109
Comparativism 195
Comparison, Varronian linguistics 105
  binary oppositions 105
Competence
  linguistic, native speaker-hearer 228
  Varronian linguistics 106
Complementarity, case grammar 361
Complementation
  obligatory 256–257
  optional 256
Complements, cognitive grammar 367
Componential semantics 297
Compositio, later Middle Ages grammar 132
'Compounded' languages 213
Compounds, Ancient Greek, Apollonius 112
Computational linguistics 227–228
Computers in translation *see* Translation, machine
Conceptual systems and language structure 213–214
Conceptualization, cognitive grammar 365
Concord *see* Agreement
Congruence, Firth 271
Congruitas 132, 134
Coniugationes verborum 123
Coniunctio 133
Conjugations
  Ancient Greek 112
  description 83
  Latin 108, 109
    Varronian linguistics 104, 105, 106
Conjunctions
  Ancient Greek grammar 84, 85, 92, 96, 97
    Apollonius 112, 113
    correlative conjunctions 94
  Latin, early Roman Empire 108
Connectionism 232
  and machine translation 441
Connectors, applicational grammar 349
Connotation, medieval philosophy of language 140
Consonants
  Ancient Greek grammar 84, 92
  early descriptions
    Ancient Greece 372
    Ancient India 371
    sixteenth-seventeenth centuries 373, 374, 375, 376
    nineteenth century 382, 384, 385
  glossematics 267
  Latin, early Roman Empire 109
  manner of articulation
    Chinese phonetics 53
    lingual 374

        Petrus Montanus 377
        Robinson and 374–375
    mixed 384
    narrow 385
    place of articulation
        Ancient Greek grammar 94
        Ancient Indian phonetics 372
        cacuminal 372
        cerebral 372
        Chinese phonetics 52
        dental (dentalveolar;alveolar;postalveolar) 92, 372
        glossematics 264
        glottal 372
        Holder and 376
        labial 92, 372, 374
        Madsen and 374
        palatal 372
        Petrus Montanus 377
        retroflex 372
        Robinson and 374–375
        Sanskrit 75
        velar 372
        Wallis and 375
    stop *see* Stop consonants
    syllabic 373
        phonetic transcription 391
    wide 385
Consortium for Machine Translation Advanced Research 443
Conspiracies, historical linguistics 207
Constituentization, historical linguistics 207
Constituents, immediate, phonology 310
Construal, cognitive grammar 365–366
Constructio 132, 134
Constructions
    cognitive grammar 367
    tagmemics 317, 318
Consuetudo
    Quintilian 110
    Varronian linguistics 105
Content
    discourse, tagmemics 317
    glossematics 265, 267–268, 290
    and meaning, Prague School 254, 255, 260–261
Context
    of situation, Firth 269–270
    tagmemics 316
Contextual boundedness 258
Contextualization, linguistic historiography 13
Continuants 88, 92
Contraction
    Apollonius 112
    Herodian 114
Contrast
    Ancient Greek grammar 101
    principles of, case grammar 361
Contrastive analysis
    ars grammatica 88, 116
    and comparative linguistics, distinction between 195
Convention, Chinese linguistic tradition 41
Convergence, historical linguistics 206, 209–210
Conversation, gender differences 232
Conversation analysis 231
Copenhagen Circle/School 226, 262
Copulas
    Ancient Greek grammar 84
    medieval philosophy of language 140
Copulation, properties of terms 139
Core Language Engine (machine translation system) 442
Corpus linguistics, influence on Systemic Theory 275
Correctness
    early Roman Imperial grammar 88
    Hellenism 94, 99, 102
    Port-Royal grammar 169–170
    syntax, Ancient Greek grammar 111
    vernaculars, Spanish Renaissance linguistics 157
Correlation, phonology 248
    markers 248
Correspondences, cognitive grammar 367
Correspondent, case grammar 359
Counter-agent, case grammar 358
Creoles, and language change 209–210
Creolization, abrupt 210
Cries, natural 184–185
CRITTER (machine translation system) 451
Cross-linguistic contacts, language change 209–210
Cross-linguistic transitivity study, comparative linguistics 201
CULT (machine translation system) 437
Cumulative function, Prague School phonology 253
Cuneiform writing
    administrative texts 19
    scribal school 19
    Sumerian 19
Cyclicity, strict, case grammar 356–357
Cypriote syllabary 90

Danish
    dialect alphabet 398
    historical linguistics 181
Darwinism, and comparative linguistics 200
Dative case
    Ancient Greek grammar 92
    case grammar 355, 357, 358, 359
Daughter language 180
De Lingua Latina (Varro) 86, 104, 149
Dead languages, contrast with living languages 153
Deaf, teaching, seventeenth/eighteenth centuries 375, 376, 377
Declaratives, Varronian linguistics 106
Declensions
    Ancient Greek 112
        Herodion 113
    Latin 108, 109
    Varronian linguistics 104, 105
Declination naturalis 104
Declination voluntaria 104
Declinationes 104
    Varronian linguistics 87
Declinationes nominum 123, 127
Decomposition, Greco-Roman tradition 89
Deconstructionism 234
Deep structure
    case grammar 353, 354, 355
    functional grammar attitude 290
    generative semantics 343
    Spanish Renaissance linguistics 159
    transformational grammar 333

- Definitions, grammatical, early medieval grammar 127
- Degrammaticalization, language change 208
- Deletion
  - Ancient Greek grammar 92, 94
    - Apollonius 112
    - Herodian 114
  - in Greco-Roman tradition 83
  - transformational grammar 328
- Delicacy, systemic theory 273
- Delimitative function, Prague School phonology 253
- Denominative terms, medieval philosophy of language 142–143
- Dependency
  - comparative linguistics 201
  - in glossematics 266
  - Guillaumian linguistics 278, 279
  - Prague School 256, 258
  - syntactic relationships
    - case grammar 358
    - graphs 241
    - substitution 241
  - syntax, cognitive operations 278
  - valency grammar 281, 282
- *Dependentia* 132, 135
- Derivational morphemes, cognitive grammar 367
- Derivational morphology, Varro 86–87
- Derivation(s)
  - early Roman Imperial grammar 87
  - generative semantics 343
  - words
    - Ancient Greek, Apollonius 113
    - applicational grammar 349
    - Arabic grammar 33
    - *declinatio voluntaria* 104
    - Latin, early Roman Empire 109
    - Transparency Principle 208
    - Varronian linguistics, *radix* 105
- *Determinatio* 135
- Development of language, stages 180
- *Dhātupātha* 67
- Diachronic linguistics
  - Italian Renaissance linguistics 152–154
  - Saussure on 224, 233
- Diacritics
  - introduction, Italian Renaissance linguistics 154
  - phonetic notation 390, 392, 393, 394, 395, 398, 399, 400
- Dialectics, study, early Middle Ages 127
- Dialectology
  - American structuralism 295
  - Ancient Greek grammar 84
  - positivism in 223
  - wave theory 245, 246
- Dialect(s)
  - Ancient Greek grammar 101
    - Apollonius 113
  - transcription, alphabets 398
- Diasynthetica, Modistic grammars 132, 133, 134
- Diatheme, Prague School 257
- *Dictio* 133
- Diction, poetic, Stoics 85
- Dictionaries
  - alphabetic organization, French Renaissance linguistics 164
  - Biblical Hebrew 24, 25
  - bilingual
    - French Renaissance linguistics 161, 164–165
    - machine translation 432–433
    - Spanish Renaissance linguistics 157–158
  - electronic 442
  - French Renaissance linguistics 164–165
  - historical linguistics 203
  - lexicographic model, French Renaissance linguistics 165
  - mechanical 432
  - rhyming, Chinese phonetics 51, 52
- *Dictum* theory 141
- Differentiation of languages, wave theory 204
- Diffusion, lexical 200, 208
- Digraphs, phonetic notation 390, 391, 394
- Dimidium 396
- Diminutives, Latin, solecisms 109
- Dionysius Thrax 99–102
- Diphthongs
  - Ancient Greek, Apollonius 112
  - Ancient Indian phonetics 372
- Direct Method in language teaching, Renaissance France 171
- Discontinuity 5
- Discourse
  - content, tagmemics 317
  - discursive intent 279
  - Guillaumian linguistics 277, 279
- Discourse analysis 231–232
  - tagmemics 315
- *Discourse on Method* (Descartes) 170, 175
- Discourse structure
  - Prague School 259–260
  - stock of shared knowledge 259
  - thematic progressions 259
  - topic/focus articulation 259–260
  - transformations and 326
- Discourses, Ancient Greek grammar 92
- Disjunction, phonology 248
- Distinctive features
  - phonemes 249, 310
  - phonology 237
- Distinctive function, Prague School phonology 253
- Distraction, Apollonius 112
- Distributed Language Translation (DLT) (machine translation system) 439
- Distribution, phonology 309, 310, 311
- Distributional method, Bloomfield 238
- Distributionalism 225, 303–304
- Diversity, linguistic 214
- DLT (machine translation system) 439
- Donatus 88, 116, 117–118
  - *Ars Maior* 123, 124
  - *Ars Minor* 123
  - commentaries 121, 130
    - medieval 125–126, 131
  - influence in Middle Ages 121–122, 130
    - early 123, 127, 128
- Drift
  - comparative linguistics 201
  - language change 207, 208
- Dual patterning
  - Ancient Greek grammar 84, 92, 101
  - functional grammar 290, 291

  Graeco-Roman tradition 89
Duration, measurement 410–412

E-strain, comparative linguistics 195, 196, 197, 198, 203, 205
East India Company Library 191
Eclipsing stance, transformational-generative grammar 5
Education
  Ancient Greece 99, 102
    grammatikos 99
    poetry 91
    sophists 91
  Middle Ages 122
  Mycenaean Greece 91
  Port-Royal petites-écoles 170–171
  Roman 103
    grammatical curriculum 87
    grammatical textbooks 115, 116–117
    influence in Middle Ages 122
    Quintilian and grammar 109–110
Effect, Prague School 256–257
Electronic Dictionary Research project 442
Elegantiae Linguae Latinae (Valla) 148, 149, 154
Elements, Modistic grammar 133
Elision, Ancient Greek grammar 92
Ellipsis
  Ancient Greek grammar 92, 113
    Apollonius 112
  ars grammatica 89
  Port-Royal grammar 169
  Quintilian 109
  Renaissance linguistics 149
Elocutionists, eighteenth century 378
ELU 442
Embedded clauses
  transformational grammar 331
  valency grammar 288
Emic/Etic 236, 319
  Arabic grammar 32
  in tagmetics 316
Emphasis, glossematics 267
Empiricus, Sextus 88, 101–102
Empty categories, in Revised Extended Standard Theory 229
Enclitics, comparative linguistics 201
Encyclopedias, early Roman Empire 108
English
  auxiliaries, analysis, generative semantics 345
  plosive system 249
  spelling 373
    reform 391, 393
  Old English (Anglo-Saxon), historical and comparative studies 183–184
ENGSPAN (machine translation system) 450
Environnement Linguistique d'Unification 443
Episememes 300
Episemions 349
Epistemology, medieval philosophy of language 141–142
Ergative languages, subject, valency grammar 284
Ergatives
  case grammar 354, 355, 362
  construction/syntax
    Guillaumian linguistics 279
    historical linguistics 207

Error analysis, Ancient Greek grammar 84
ETAP (machine translation system) 443
Ethiopia, languages 180
Ethiopic 151
Ethnomusicology, emic/etic distinction 319
Ethnoscience, American structuralism 297
Etic *see* Emic/Etic
Etruscan, relationship with Tuscan 153
Etymologia (word-classes), Modistic grammars 132, 133–134
Etymologiae (Isidore of Seville) 123, 124
Etymology
  Ancient Greek grammar 92, 102
    Apollonius 112
  exegetical grammar 125–126
  Italian Renaissance linguistics 153
  Latin linguistics
    early 104
    early Roman Empire 107
  medieval 121, 124
  Quintilian 109–110
  Renaissance studies 150–151
  Varronian linguistics 105
Euphony
  Quintilian 109
  Stoics 85
Eurolang project 438, 441
Eurotra machine translation project 438–439
Exclamations, Ancient Greek 96
Executive Communications Systems, Inc. (ECS) 450
Exegesis, philologic, Spanish Renaissance linguistics 157
Exitus 105
Experiencer
  case grammar 359, 361
  Prague School 256–257
Exponents, Firth 271
Expression
  glossematics 265, 267, 290
  Guillaumian linguistics 278–279
Expressive function, Prague School phonology 252
Expressivity, Guillaumian linguistics 278–279

Factitive case relation 358
Fallacy, medieval philosophy of language 138–139
Falsity, propositions, medieval philosophy of language 141
Family trees, languages 180
Faṣāḥa, Arabic 30
Fenno-Ugric languages 196, 197, 203
Figurae etymologicae 103
Filters, in Revised Extended Standard Theory 229
Finite-state grammars 324, 325
First Grammatical Treatise (Icelandic, anon) 373
Firth, J.R. 226, 268–271
Focus, Prague School 254, 257–259
Form, and meaning, tagmemics 316, 318
Formalism 226
Formants 380, 381, 414
France
  lexicography 164–165
  Renaissance linguistics 161–166
French
  acceptance in France 169–170
  'advanced French', Frei and 241

- alphabet reform 164
- articles, Guillaumian linguistics 226
- diacritics, Renaissance linguistics 163
- dialectology 223
- dictionaries 161, 164–165
  - bilingual 161, 164–165
- etymologies (works), 16th century 161–162
- etymology, Renaissance linguistics 162, 163, 165
- glossematic description, example 267–268
- grammar, Guillaume 278
- grammars (works)
  - early 161, 162–163
  - foreign language learners, 16th century 161, 163
  - Renaissance 150
- grammatical description, Renaissance linguistics 162–163
- lexicography 164–165
- linguistic geography 200
- morphology, Renaissance linguistics 162–163
- nouns, declension, Renaissance linguistics 162
- origins, 16th century theses 165
- orthography
  - Meigret 162, 163–164
  - reform 150, 162, 163–164
- Renaissance linguistics 150, 161–166
  - phonetics 163
  - phonology 162, 164
  - pronunciation 163–164, 166
- sixteenth century 165
- standardization 165–166
- syntax
  - Guillaumian linguistics 226
  - Renaissance linguistics 162–163
- verbs, conjugation, Renaissance linguistics 162
- vocabulary
  - dictionary tradition of study 161
  - expansion, 16th century 161, 165
  - neologisms 161, 165

French National/Imperial Library, Sanskrit manuscripts 190
French Royal Library, Sanskrit manuscripts 188
Frequency of use, and language change 200
Frisian, Old Frisian 183
Function, phonology 252–253
Functional Generative Description, Prague School 255–256, 260
Functional grammar 290–295
- axiomatic approach 290
- empirico-deductive approach 290–291
- grammatical phrases 293
- and morphology 294
- nucleus satellites relationship 292, 293
- phonology and 291
- substance 290
- syntax 293–294
- and systemic theory 273

Functional linguistics 226
- generativism and 290
- Geneva School 241
- historical survey 290

Functionalism
- cognitive grammar 367
- Prague School 226, 254

G-strain 195, 196, 197, 200, 214

- first Indo-European monograph 203, 213
- interlingual kinship, areal connections 202

Gapping, Greco-Roman language science 89
Gender
- agreement, Ancient Greek grammar 91–92, 94
- Ancient Greek grammar 84, 94, 101
- functional grammar 292, 294
- Latin
  - early Roman Empire 109
  - solecisms 109
- order, Ancient Greek grammar 92

Genealogies
- comparative linguistics 195–196, 198
  - influence of science 198, 199
- tree pattern 198

General grammar
- in Port-Royal grammatical tradition 169–174
- and rationalism 170

Generalized Phrase Structure Grammar 230
Generative Grammar, Phrase Structure 267
Generative linguistics
- historical linguistics 207–208
- *langue* 235

Generative phonology 230
Generative semantics 229, 232, 332–335, 343–348
- Ancient Greek grammar 112
- auxiliaries, analysis 345
- history 345–347
- Katz-Postal Hypothesis 333
- lexical decomposition analyses 344
- linguistic level/levels 343
- performative analysis 345
- policies on conduct of research 344–345
- quantifier lowering 346
- rule government 346
- rules
  - derivational constraints 344
  - global 344
- semantic structure, nature of 343
- sentences 343
- syntactic categories 343, 347

Genetic relations between languages 203–204, 212
- typological framework 213

Geneva School of Linguistics 239–243
- historical linguistics 240, 242
- structuralism 224, 242
- stylistics 240
- synchronic linguistics 240

Genitive case, Ancient Greek grammar 92
Geography, linguistic 230
- comparative linguistics 200
- historical linguistics 205

Georgetown Automatic Translation (GAT) 434, 446
Georgetown University, machine translation research 433–434, 445–446
German
- comparative linguistics 179–180
- dialects 223
- High German (*Hochdeutsch*) 203
- historical linguistics 203
- linguistic geography 200
- plosive system 249
- Swiss German, comparative linguistics 200

German-speaking lands, early historical and comparative studies 179–180

Germanic languages
  historical linguistics 203
  phonology
    historical linguistics 204
    systematic correspondences 203–204
  North Germanic, philology 180
  Old Germanic 180–181
    literature 180, 181
Gesture, and origins of language 185, 186
GETA 438
Glides
  Ancient Indian phonetics 372
  Sweet and 385
Gloss-commentaries 129
Glossematics 262–268, 290
  analytical procedure 265–266
  avoidance of metaphysical language 263
  content and expression in 265, 267–268
  deductive reasoning 263–264, 265–266
  description of French 267–268
  discovery procedure 266
  form and substance in 265
  history 262–263
  logical positivism in 262, 263–264
  place of articulation 264
  relations 266
  Saussurean influence 238
  universal framework for language description 262
Glottal stop 376
Glottalic theory, historical linguistics 209
Goal, case grammar 359, 362
God's truth and hocus-pocus 312, 313
Gothic 181, 183
  Moeso-Gothic 181
Governance, Arabic grammar 34–35
Government and Binding Theory 229–230
Governors, valency grammar 281
Grameme 314
Grammaire générale et raisonée (Lancelot and Arnauld) 169, 170, 172–174, 175
Grammar
  Ancient Greek 90, 94–95
  Arabic linguistic tradition 28–38
  ars grammatica, Middle Ages 122
  autonomy, Spanish Renaissance linguistics 159
  causae inventionis, later Middle Ages 131
  comparative-historical 5
  definition, Ancient Greeks 100, 102
  descriptive, Spanish Renaissance 157, 158
  exegetical 125–126
  expected shifts in 207
  explanatory, Spanish Renaissance 157
  Firth's views 271
  grammaticae ratio 159
  grammatical processes, American structuralism 298
  hierarchy, tagmemics 317
  historical, Italian Renaissance 153
  history
    Arabic tradition 28–32
    Babylonian texts 19–21
    Pāṇinian linguistics 59–65
    Tamil tradition 77–79
  humanistic 147–149
  medieval
    Carolingian 122
    early 121–129
    later 130–135
    pre-Carolingian 123–126
  rational, Port-Royal tradition 169
  Renaissance 147–149
    Italy 154–155
  syntagmatic and paradigmatic relations 271
  teaching, in Carolingian Renaissance 122
  technical terms (*termini technici*), later Middle Ages 132
  universal language schemes, 17th century 175
Grammars (works)
  Christian 127
  early Roman Imperial grammar 108–109
  exegetical 127
  humanist, Middle Ages 130, 138
  Insular elementary 121, 123–124, 127, 127–128
  Middle Ages, early 122, 123–128
  parsing 122, 127–128
  regulae-type 88, 123, 128
  school (*Schulgrammatik*) 122
  scientific method 176
Grammatica 130
Grammatica practica 130
Grammatical categories
  Arabic tradition 35
  French Renaissance linguistics 162
Grammatical classes, cognitive grammar 366–367
Grammatical commentaries 110, 116
  ars grammatica 88–89
Grammatical relations
  case grammar 352, 354
  inflection and 352–353
Grammaticalization, historical linguistics 208
Grammatici, teaching of 122
Grammatics (grammar as metatheoretic resource) 274
Grammatikē, Ancient Greek linguistics 94, 102
Greece, Ancient
  education 91, 99, 102
  grammarians 90–102, 111–115
  phonetics 372–373
  recreation 94
Greek
  Hellenism (correctness) 94, 99, 102
  history 203
  influence on Italian 153
  influence on Latin 152
  lexicography 149
  Renaissance studies 149
  verbs
    analysis 97
    infinitives 112
  Ancient Greek
    alphabet 90, 100, 101
    Attic 91
    barbarisms 94, 99
    dialects 91
    grammar 90–102
    Hellenism 94, 99, 102
    linguistics 84–86, 93
    phonology 92, 94, 100, 101
    syntax 111–113
    writing systems 90
  Mycenaean Greek 206

Gregg shorthand, syllabary 90
Grenoble University, Groupe d'Etudes pour la Traduction Automatique 438
Grimm's law 204
Groupe d'Etudes pour la Traduction Automatique (GETA) 438
Guang yun 42, 44
Guillaumian linguistics 277–279
  act of language 277
  psychoméchanique du langage 277
  théorie des aires 278
  theory of incidence 278, 279

Han'gul script, phonetics 54
Harris, Zellig S.
  American structuralism 298, 304
  post-Bloomfieldian phonology 310–311
  on transformations 326–327
Head-driven Phrase Structure Grammar 230
Heads
  cognitive grammar 367
  valency grammar 281
Hebrew
  Biblical 21–28
    comparison with Arabic 25, 27
    comparison with Aramiac 27
    dictionaries 24, 25
    grammar 24, 25
    influence of Arab grammarians 22, 23, 27
    pronuciation 24
    status 26–27
    verbs 23
    writing 22
  comparative linguistics 180
  linguistic tradition 21–28
  mishnaic 26–27
  proto-language 150–151
  Renaissance studies 150–151, 165
  Samaritan Hebrew 25
Hellenism (correct Greek) 94, 99, 102
Helmholtz resonators 417, 419
Herodian (Herodianus Technicus) 87, 111, 113–114
Hierarchy/Hierarchies
  Firth 269
  tagmemics 316–318
Hinduism, *mantras* 66
Hiragana syllabary 56
Histoire des mentalités 9
Historiae 107, 110
Historical linguistics
  early, Britain 183–184
  Geneva School of Linguistics 240
  German-speaking lands 179–180
  history of 203–212
  Low Countries 181
  Saussure 233
  Scandinavia 180–181
  twentieth century 222, 227
Historiography of linguistics 3, 6, 7–16
  approaches to 9–12
  development of principles 12–15
  and history and philosophy of science 10–11
  influence argument 14–15
  Kuhn's influence 8, 11
  metalanguage 13–14
  principle of adequation 13–14
  principle of contextualization 13
  principle of immanence 13, 14
  and sociology of science 11–12
History of Ideas 9, 12
History of linguistics 3–7
  climate of opinion approach 10
  data-orientation 4
  historical method debate 10
  and intellectual history 9–10
  metahistory 10
  professionalization 6
Hittite 206, 233
  letter *H* 227
  Hieroglyphic Hittite 206
  Indo-Hittite 206
Hochdeutsch see German, High German
Hocus-pocus, God's truth and 312, 313
Homonymy, Ancient Greek grammar 93
Humanism 147–149
  attitude to modistic theory 135
  classical, Spain 157, 160
  Italian 152, 154
  medieval grammars 138
  Spanish 157
  translation and 421–422
  vernacular, Spain 157, 160
Hungarian, genetic relations 203
Hylomorphic theory, matter/form contrast 133, 134
Hymns, translation 426
Hyperbaton
  Ancient Greek grammar 94
    Apollonius 112
  Quintilian 109
Hypothesis, Ancient Greek grammar 97

Icelandic
  dictionaries 181
  First Grammatical Treatise 373
  historical linguistics 180–181
  Old Icelandic 183
  origin 198, 203
Iconicity 230
Ideas
  association of, origin of language debate 185
  history of 9, 12
  sources of, origin of language debate 184
Idiolects
  Ancient Greek grammar 101
  early Roman Imperial grammar 88
Iḍmār 34
'Illas 31
Illocutionary forces
  Ancient Greek grammar 92, 94, 95, 96
  identification 83
Illuminism 420, 421
'Ilm al-bayān 35
'Ilm al-ma'ānī 35
Imagination, in origin of language debate 184
Imitation, social 209
Immanence, principle of, linguistic historiography 13, 14
Imperatives
  Ancient Greek grammar 91, 96

  - Varronian linguistics 106
- Incidence
  - external/internal 278
  - Guillaumian linguistics 278, 279
- India(n)
  - ancient
    - phonetics 72–79, 371–372
    - phonology 76–77
  - colonialism 189–190
  - grammatical tradition 59–60
  - linguistics, ritual and 59
  - meaning, theories of 66–71
    - grammatical tradition 66–68
    - philosophical 68–71
  - missionaries and travellers 188–189
- Indian languages
  - 17th-18th century studies 188
  - comparative studies 188, 197
  - writing systems 190
- Indicative mood, functional grammar 293
- Indicatives
  - Guillaumian linguistics 278
  - Varronian linguistics 106
- Indo-European languages
  - comparative linguistics 179
    - role of Sanskrit 188, 189–190, 191
  - historical linguistics 204
  - 'Indo-European fable' 198
  - megalocomparison with other language groups 206
  - morphosyntax 206
  - origin of term 195
  - phonology 206
    - consonants 206
    - glottalic theory 209
    - laryngeal theory 205, 206, 209
    - semivowels 204
    - vowels 205, 206
  - reconstruction, *Grundriss* 206
  - sound laws 206
  - super-divergence 206
  - Proto-Indo-European 204
    - consonants, plosive 209
    - 'sonant coefficients' 227, 233
- Inductivism 11
- *Infectum*, Varronian linguistics 106
- Inflecting (inflectional; flectional) languages 197
  - typology 213, 214, 215
- Inflection
  - Ancient Greek grammar 101
    - Apollonius 113
  - case
    - and case relations 352–353
    - and semantic function 352
  - *declinatio naturalis* 104
  - desinential, Arabic grammar 33, 34
  - genitive 352
  - nominal 352
  - Varronian linguistics 104, 105, 106
- Inflectional morphology, Varro 86–87
- Inlaut, historical linguistics 204
- Innateness
  - Aristotle 85
  - Chomsky 228
  - origin of language debate 185–186
  - universal mental language, Ancient Greek grammar 95
- 'Inner spirit' of languages 203
- Inquisition, Spanish 158, 159
- Insertion, Ancient Greek grammar 92
  - Apollonius 112
- Instantiation, systemic theory 273
- Instrumental case, case grammar 358, 359, 360
- Instruments, case grammar 359
- Insular elementary grammars (works) 121, 123–124, 127–128
- Interaction, social, language and 205
- *Interiectio* 133
- Interlinguas, machine translation 431–432, 435, 436, 439, 441
- Internal modification, historical linguistics 204
- International Association of Chinese Linguistics 44
- International Phonetic Alphabet 398, 399
- International Phonetics Association (IPA) 386, 387
- *Internationale Zeitschrift für allgemeine Sprachwissenschaft* 386
- Internet, machine translation on 444
- Interpreters, colonial administration 427
- Interrogatives
  - Ancient Greek 112
  - Varronian linguistics 106
- Intonation
  - functional grammar 291
  - glossematics 267
  - patterns 378
  - transcription 390
- Introspection, acceptance by Chomsky 229
- Intuitions, native speakers, phonemes 307, 312
- Inversion, Ancient Greek, Apollonius 112
- Ireland, early Medieval linguistic scholarship 121
- Island constraints 339–340
- Isolating languages 197
  - typology 213, 215
- Isorrophy 93
- Italian
  - ancestry and change 152–154
  - diacritics 154
  - dialects, Renaissance linguistics 156
  - dictionaries, Renaissance 155
  - grammar, Renaissance linguistics 154–155
  - orthography, Renaissance 154
  - phonetic analysis, Renaissance linguistics 154
  - *Questione della lingua* 152
  - Renaissance linguistics 149–150, 152–156
  - vernaculars 152, 156
    - influences on 152
    - Renaissance 149–150
- Italy
  - Neolinguistic School 243–246
  - Renaissance linguistics 152–156
- Item and arrangement 297
- Item and process 297

- Jansenism 170
- JANUS, machine translation project 443
- Japan, history of linguistics 45–51
- Japanese
  - dialect geography 51
  - grammar
    - history 47, 50

    - *kakari-musubi* agreement principle 47
  - history 46–50
  - linguistics
    - Chinese and Indian influences 46
    - comparative 49–50
    - history 45–51
    - *kokugagaku* school 45, 50
    - *kokugaku* (national learning movement) 45, 47–48
  - phonemic transcription 309
  - phonetics 56
  - phonology, 50–sound chart 46–47
  - poetics, history 47
  - translation, machine-aided 437
  - writing systems 45–46
- Japhetic languages 227
- Jespersen, Jens Otto Harry 224
  - on dependency 278
  - phonetics 387
    - notation 397, 398
- Jesuits, discovery of Sanskrit 188
- *Ji yun* 42
- *Jihvāmūḷūya* 75
- Judaism, liturgy, translation 428
- Judgement, Port-Royal grammatical tradition 172, 173
- Junctures 311, 312

- *Kalimas* 33
- *Kana* writing system/syllabaries (Japanese) 45, 46, 56
  - *Gojūon* 56
  - *see also* Hiragana; Katakana
- *Kanji*, in Japanese 45
- KANT (machine translation system) 440
- *Kāraka*-theory 67
- *Karakas* 63–64
- *Kasika* (Jayaditya and Vamana) 60
- *Katakana* syllabary 56
- *Katallēlōtes*, Alexandrians 88
- Katz-Postal Hypothesis 333
- KBMT (machine translation system) 450
- Kielikone (PC translation system) 443
- *Kitāb al-Tanqīh* (Ibn Janāh) 24, 25
- Knowledge, theory, Saussurian epistemology 242
- Korean
  - *han'gul* alphabet 54
  - phonetics, history 53–56
  - phonology, vowels 54
  - writing systems
    - hP'ags-pa 54, 55
    - *idu* 54
- *Kūfan* 32
- Kymographs 409

- *Laḥn* 28–29, 30
- *Langage*, Saussure 235
- *Langue*
  - generative linguistics 235
  - Guillaumian linguistics 277
  - langue/parole dichotomy, Saussure on 224, 234–235
  - Saussure on 221, 224
  - social nature 235
  - sociolinguistics 231, 235
  - as syntagmatic and paradigmatic relations system 237–238, 239
  - as system of signs 235–236
    - Varronian linguistics 106
- 'Laryngeal' theory, historical linguistics 205, 206, 209
- Larynx
  - anatomy, early descriptions 377, 378
  - lowering 376
- Latin
  - *ars grammatica* 115–118
  - case system
    - ablative case 109
    - *ars grammatica* 118
    - early Roman Empire 109
    - Varronian linguistics 105
  - conjugations, in Roman tradition 105, 106, 108, 109
  - declensions, in Roman tradition 105, 106, 108, 109
  - dictionaries, Spanish-Latin 158
  - early language science 103–106
  - early Roman Empire 107–110
  - etymology 105
  - exegesis of texts 121–122, 125–126
  - grammar
    - Italian Renaissance linguistics 154–155
    - teaching 116–117
  - grammars (works), Spanish Renaissance 158
  - history 203
  - interjections, substitution for article 108
  - lexicon
    - first 87
    - historical linguistics 107
  - morphology 108
    - Priscian 117
  - morphophonemics, Varronian linguistics 105
  - *ordo*, Varronian linguistics 106
  - orthography 103
  - philology 103–104
  - phonology 108
  - relationship with Greek 152
  - Renaissance writings 147–149
  - syntax, Priscian 117
  - Varronian linguistics 104–106
  - verbs
    - defective 109
    - early Roman Empire 109
    - future perfect indicative 106
    - impersonal passives 109
  - vowel system 248
  - written records, pre-Varronian 103
- *Latinitas* 108
- *Lectio*, Quintilian 110
- *Lekta* 96
  - Stoics 85
- Lengthening, Ancient Greek grammar, Herodian 114
- Letters
  - Ancient Greek grammar 92
  - Aristotle 84
  - Greco-Roman phonetics 372
  - and sounds 402
- Levels, Ancient Greek grammar 101
- Lexical decomposition analyses, generative semantics 344
- Lexical relations, case grammar 354
- Lexicase 356
- Lexicography
  - Arabic 35–37
  - Biblical Hebrew 24, 25, 26
  - Chinese 41–42

  - comparative, first lexicographer 204
  - Greek 149
  - Renaissance 148, 149
    - France 164–165
    - Italy 155
    - Spanish 157–158
  - Sumerian 19
  - *see also* Dictionaries
- Lexicon
  - functional grammar 294
  - hierarchy, tagmemics 315
- *Lexis* 96, 100
- Lexotactics, stratificational grammar 320, 322
- Libretti, translation 426, 429
- Linear B 90
- Linearity, of signifiers 237
- *Ling shu jing* 43
- Linguistics, twentieth century 221–233
- Linguistics Research Center (LRC), University of Texas 434–435, 449
- Literature, translation
  - Age of Reason 423
  - history 420
  - nineteenth century 425–426
  - Renaissance 423
  - romanticism and 425–426
  - twentieth century 429
- Liturgies, translation into vernacular 422, 427
- Loanwords, phonological treatment 313
- Localist Hypothesis, case grammar 362
- Locative case, case grammar 358, 359, 361
- Locus, case grammar 359
- Logic
  - and grammar, Renaissance 147
  - *logica*, later Middle Ages 130, 131
  - *logica antiqua* 138
  - *logica moderna* 138, 139
  - *logica nova* 138
  - *logica vetus* 137–138, 139
  - Port-Royal grammar 172
  - propositional, Varronian linguistics 104
  - terminology, fusion with grammatical terminology 130
- Logical positivism, glossematics 262, 263–264
- LOGOS (machine translation system) 437, 441, 448, 450
- London School of Linguistics 226, 230, 231, 268–276
- Lord's Prayer
  - comparative linguistics 179, 196
  - Indian languages 188
- Low Countries, early historical and comparative studies 181
- Luwian 206
- Lycian 206
- Lydian 206

- MACROCAT 438
- Macroroles, case grammar 362
- *Mahabhasya* (Pantañjali) 60
- *Mantras*, Hinduism, interpretation of meaning 66
- MAPTRAN (machine translation system) 441
- Marey tambours 409
- Markedness
  - phonological systems 248
  - Prague School theory 226
- Markers
  - *anubandha* 68
  - grammatical, cognitive grammar 367
  - morphological, derivation 208
- Marxism 232
- *Masora* 27
- Masoretes 22
- Mathematics, Bloomfield 302
- *Mātrā* 73
- *Mātras* 372
- Maxim of manner 344
- Meaning
  - collocation 270–271
  - content and, Prague School 254, 255, 260–261
  - contextual theory (Firth) 269
  - Indian theories 66–71
  - and intensional semantics 260
  - potential 272
  - Prague School 260
  - sentences, Indian theories 67–69, 70
  - spectrum theory 269, 271
  - tagmemics 316, 318
- Means, case grammar 359
- Megalocomparison, historical linguistics 206
- Mental language, medieval philosophy of language 142
- Mental terms, medieval philosophy of language 141–142
- Mentalism 225
- Mentalist tradition, Spanish Renaissance linguistics 159
- Mentalités, histoire des 9
- Mergers, historical linguistics 207
- *Merkmal*, origin of language 186
- Mesopotamia *see* Babylonian
- Metafunctions, and systemic theory 273
- METAL (machine translation system) 435, 436, 437, 449
- Metalanguage(s)
  - concept, applicational grammar 351
  - linguistic historiography 13–14
  - Pāṇini 68
  - Varronian linguistics 106
- Metaphor(s) 229
  - Aristotle 84
  - biological 234
  - Quintilian 109
- Metathesis, Ancient Greek grammar 92
  - Apollonius 112
  - Herodian 114
- METEO (machine translation system) 436
- Metonymy, Ancient Greek grammar 93
- Metrics
  - Ancient Greek grammar 84, 100
  - *ars grammatica* 115, 116
- MICROCAT 438
- Microtac 438, 443
- Middle Ages
  - grammar
    - early Middle Ages 121–129
    - modistic 132–135
    - premodistic 130–132
  - linguistics, later Middle Ages 130–137
  - philosophy of language 137–144
- Midrash 22
- *Mikhloe* (Ḳimḥi) 26
- Mimamsa 68–69
- Minimalism, Chomsky 230
- *Mishnah* 26–27

Missionaries, Christian
  phonetic transcription 394
  Sanskrit studies 188
  translation work 427
Modality
  case grammar 353
  functional grammar 292
Modifiers
  cognitive grammar 367
  functional grammar 292
Modistae 132–135
  attitude of Humanists to 135, 148
  grammars 132–133, 135
Modulation, American structuralism 300
Modus consignificandi 133
Modus essendi 133
Modus intelligendi 133
Modus significandi 131, 132–135
  accidental modes 132, 133, 134
  active mode 132, 133
  essential 133
  expression of mental concept 133
Monemes
  amalgamated forms 293
  classes 292, 293
  discontinuous 293
  functional grammar 292–293
  joint/free 291
  subordinated/coordinated 292
  transfer 292
Monogenesis
  Ancient Greek grammar 84, 93
  and Sanskrit 189, 190
Mood
  Ancient Greek grammar 94, 95
    Apollonius 112–113
  Stoics 85
MOPSTRANS (machine translation system) 450
Moria 96
Morphemes, American structuralism 299–300, 304
Morphology
  American structuralism 300–301
  Ancient Greek grammar 92, 95–96
  Arabic linguistic tradition 32–33
  comparative linguistics 198
  derivational
    applicational grammar 349
    Varronian 104
  early Latin linguistics 104, 105
  French Renaissance linguistics 162–163
  inflectional, Varronian 104
  Latin, *ars grammatica* 115, 117–118, 123
  variation (*declinatio*), Varronian linguistics 104
Morphophonemic rules, transformational grammar 328
Morphophonemics 308
  American structuralism 300–301
  Varronian linguistics 105
Morphotactics, stratificational grammar 320–321
Mother language 180
Mu (machine translation system) 438
Music, Stoics 85
Mutes, Aristotle 84

Nagari script, Roth's tables 188
Nahua, grammars (works) 158
Nāmarūpa 69
Naṉṉūl 78
Native speakers, intuitions, phonemes 307
Natural cries 184–185
Natural morphology 230
Natural syntax 230
Naturalism, Chinese linguistic tradition 41
Naturalness, and unmarked elements 226
Naturlaut 382
Needs, fundamental, language 241
Negation
  Ancient Greek grammar 95, 96
  Prague School 258
  theory, Mimamsa 69
Neo-platonism 138
Neogrammarians 4, 205, 222, 223
  comparison with Neolinguists 245
  linguistic change 245–246
  origin of term 204–205
Neolinguistic School, Italy 243–246
  anti-positivistic background 244–245
Neolinguistics
  areal norms 245–246
  areas of activity 245
  Croce's influence on 227, 244
  on linguistic change 245
  origin of name 244
  reception and critique 246
Neologisms, Quintilian 109
Networks, relational, stratificational grammar 320, 321
Neural networks 232
  and machine translation 441
Neutral, case grammar 361, 362
Neutralization
  archiphoneme and 251–252
  internally conditioned 251
New Theory of Language (Marr's) 227
Nighaṇṭu 66
Nirukta 66
Nodes, valency grammar 281
'Noëtic' languages 227
Nom en effet 277
Nom en puissance 277
Nomen 133–134
Nominalism 135
  post-Bloomfieldian phonology 312
Nominalizations
  transformational grammar 329, 335–356
  transitive verbs, Ancient Greek grammar 95
Nominals
  cognitive grammar 366, 367
  derived 335
  see also Nouns
Nominative absolute, Ancient Greek 102
Nominative case
  Ancient Greek grammar 92, 111
  inflections 352
  predicate, Ancient Greek grammar 111
Nominative systems, Guillaumian linguistics 279
Nonymy 93
Nostratic languages 206, 227
Nostraticism 198
Notations

  phonetic *see* Transcription, notations
  tagmemics 318–319
Notional grammar, case grammar and 357–358
Noun phrases
  Ancient Greek 95
    Apollonius 111
  case relations 361–362
  cognitive grammar 367
  complex, head marking 201
  Guillaumian linguistics 279
  role, Plato 84
Nouns
  actualized 277
  Ancient Greek 92, 95, 100
    Apollonius 112
  Aristotle 84, 85
  categorematic terms 139
  cognitive grammar 366
  common, Ancient Greek 96
  functions, applicational grammar 348–349
  gender, Ancient Greek 94
  inflections, Ancient Greek grammar 94
  Latin, early Roman Empire 108, 109
  potential 277
  predicate, agreement, Ancient Greek grammar 94
  proper, Ancient Greek 96
  Stoic grammar 85
  valency 286–287
  Varronian linguistics 105
Nouvelle Méthode latine, La (Lancelot) 171–172
Nucleus, functional grammar 292, 293
Number
  agreement, Ancient Greek grammar 92, 94
  Ancient Greek grammar 84, 94
  Latin, solecisms 109
  order, Ancient Greek grammar 92
Numerals, mathematical, Bloomfield 302

Objective, Prague School 256–257
Objective case, case grammar 358
Object(s)
  case grammar 354, 358, 359
  cognitive grammar 367
  functional grammar 294
  glossematics 268
  Guillaumian linguistics 279
  valency grammar 281, 285
Observer perspective, tagmemics 315
Omission, Apollonius 112
One-stance-per-clause principle 361
Onomatology, functional, Prague School 254
Onomatopoeia, Quintilian 109
Ontology, medieval philosophy of language 141–142
Opacity 208
Opacity condition 341
Oppositions, phonological 247, 250
  Ancient Greek grammar 101
  bilateral/multilateral 251
  equipollant 251
  homogenous/heterogenous 251
  privative/gradual 251
  proportional/isolated 251
Optatives, Ancient Greek grammar 91, 96
Optimizer (translator's workstation) 441
Ordo 106
Organic character of language 198, 199–200, 234
  rejection 205, 244
Origin, Prague School 256–257
Origin of language
  eighteenth century debate 184–187
  monogenesis 84, 93
  polygenesis 84, 93
'Original' languages 213
Orthoepists 374
Orthography/Orthographies
  Ancient Greek 102
    Apollonius 113
  Latin
    early Roman Empire 107, 108
    Varronian linguistics 103
  Quintilian 110
  Renaissance linguistics 150
    French 161–162, 163 164
    Italian 154
    Spanish 159–160
  see also Spelling
Oscillograms, early 409, 414
Oxford Calculators 135
Oxford Movement 426
Oxford University, Boden chair 191

PA TRANS (machine translation system) 441
Pada 72
Palaeontological analysis (Marr's) 227
Palaeontology, linguistic 210
Palaeotype 395
Palaic 206
Palatalization, Chinese phonetics 53
Palatals 372, 375
Palatograms 404
Pangloss machine translation project 441
Pāṇinian linguistics 59–65
  Aṣṭādhyāyī 59–60
    commentaries on 60
    grammatical analysis in 60–61
    morphology 62–64
    syntax 63–64
  Dhātupātha 67
  grammar 59
    affixes 61
    augments 61
    blocking technique 62, 63
    definitions (*samjñā*) 60
    economy in 61
    'elsewhere' case 62
    headings (*adhikāra*) 60
    kārakas 63–64
    metarules (*paribhāṣa*) 60
    operational rules (*vṛtti*) 60–61
    order of rule application 62
    replacement technique 63
    samāsa 61
    technical terms 61
    types of rules 60–61
  kāraka theory 67
  linguistics, background to 59–60
  metalanguage 68
  phonetics 371

- phonology 64–65
- semantics 66–67
- *Sivasūtras* 64–65

Pāṇiniya-śiksā 75
Paradigm-types, strong/weak, historical linguistics 204
Paradigmatic relations
- American structuralism 304
- Firth 271
- glossematics 266
- Saussure on 237–238

Paradigmatism 11
Parallel distributed processing (PDP), cognitive grammar 367
Parasynthemes 291
Paribhāṣā 60, 68
Parole
- distinction from *langue*, Saussure on 224, 234–235
- Varronian linguistics 106

Paronyms 142
Pars orationis 132–134
PARS (PC translation system) 443
Participants, case grammar 361, 362
Participium 133
Participles
- agreement, Ancient Greek 94
- Ancient Greek grammar 97
  - Apollonius 112

Particles, Ancient Greek grammar 96
Parts of speech
- accounts of 83
- Ancient Greek grammar 94, 96, 100
  - Apollonius 112
- Aristotle 84
- *ars grammatica* 115
- early Latin linguistics 87
- early Roman Imperial grammar 108
- Stoic grammar 85
- *Techne Grammatike* 86
- Varronian linguistics 104–105

Passive transformation, Greco-Roman tradition 89
Passive voice, Ancient Greek grammar 95, 97
Passives, case grammar 353, 355, 357
Path, case grammar 359
Patient
- case grammar 356, 359
- centrality 356, 361
- Prague School 256–257

Patronymics, Latin, solecisms 109
PC-Translator 438, 443
Perception, linguistics and 232
Perfectum, Varronian linguistics 106
Performance, Varronian linguistics 106
Permutation
- Ancient Greek grammar 92
- in Greco-Roman tradition 83
- transformational grammar 328

Person, Ancient Greek, Apollonius 111
Perspective, cognitive grammar 365–366
Petites-écoles, Port-Royal 170–171
Philology
- comparative, American structuralism and 295
- humanist 157

Philosophical languages, seventeenth century Britain 174–175
Philosophy
- of language, medieval 137–144
- New, seventeenth century theories 176

Phone, use by Stoics 96
Phonematics 262
Phonemes/Phonemics
- as abstract mental sound pattern 238
- American structuralism 299–300, 303
- Ancient Greek grammar 101
- bi-uniqueness 307, 309, 311
- Bloch on 308–309
- boundary signals 252
- Chao Yuen-Ren on 307, 312
- coexistent systems 313
- discovery procedures 307
  - test of substitution 307
- distinctive features 249, 310
- features 309–310
- as a 'fiction' 308
- functional view 247
- identification 307
  - Trubetzkoy 250
- junctures 311, 312
- long components 310
- markedness 248
- mentalistic definition 307–308
- mixing of levels 306, 307, 311
- overlapping 307, 308
- physical view 247, 308
- psychological view 247
- and signifier concept 236
- Swadesh on 307, 312
- systems 249–250, 306
- theories
  - Bloomfield 306–307
  - post-Bloomfieldian 307–308
  - Prague School 247–252
- variants 248–249, 250–251
  - combinatory 250
  - free 311
  - optional 250

Phones 309
Phonetic modification, American structuralism 300
Phonetic Teachers' Association 386
Phonetics
- acoustic 414–415
- Ancient Greek, Apollonius 112
- ancient Indian 72–79
  - descriptive techniques 75–76
  - phonology and 76–77
- articulatory
  - history 374, 402–408
  - speech physiology and 402–408
- experimental
  - history 386, 387, 408–415
  - theoretical background 407–408
- glossematics 262, 264
- history 371–388
  - China 51–53
  - early modern 401–416
  - East Asia 51–56
  - experimental phonetics 379–381, 386, 387
  - general phonetics 374
  - Germany 386–387

    Greece 372–373
    India 371–372
    Japan 56
    Korea 53–56
    Middle Ages 373
    nineteenth century Britain 383–386
    Rome 373
    seventeenth-eighteenth centuries 374–377
  Indian, Pāṇini 64–65
  Italian Renaissance linguistics 154
  notations *see* Transcription, notations
  origin of term 401
  positivism in 222–223, 238
  Prague School 247
  relationship with phonology, ancient India 76–77
  teaching 386
Phonetische Studien 406
Phonocentrism 234
Phonography 393
Phonological analysis and classification, Plato 84
Phonological units, underspecification 230
Phonology
  alternations 307
  American structuralist 296–297
    Bloomfield and 306–307
    post-Bloomfieldian 306–314
    realism v. nominalism 312
  Ancient Greek 92, 94, 95–96, 100, 101
    Apollonius 112
  anti-mentalism 306, 311, 312
  ars grammatica 115
  autosegmental 230
  boundary signals 252
  description, French Renaissance linguistics 162
  distinctive features 237
  distribution 309, 310, 311
  Firth 269, 271
  functional 238, 252–253
  functional grammar 291
  generative 230
  hierarchies, tagmemics 317
  junctures 311, 312
  markedness 248
  minimal pairs, *First Grammatical Treatise* 373
  natural 230
  older stages of Chinese 43–44
  opposition 247, 250–251
  Prague School 247–253
  reconstruction, historical linguistics 203–204
  relationship with phonetics, ancient India 76–77
  Saussurean influence 236
  simultaneous components 310
  strength, comparative linguistics 201
  syntagmatic and paradigmatic relations 271
  systems 248
  typology 310
Phonometry 412, 415
Phonotactics
  glossematics 267
  stratificational grammar 320
Phrase makers, transformational grammar 330
Phrase structure, Chomsky on 229
Phrase structure rules
  Generative Grammar 267
  transformational grammar 328
Phrasic intent, Guillaumean linguistics 279
Phrygian, proto-language theory 203
Physiology, speech
  and articulatory phonetics 402–408
  nineteenth century 381–383, 402–408
Pidgins, and language change 209–210
Pike, Kenneth Lee 228, 301, 304
  phonemics 311–312
  phonetic notation 398
  tagmemics 314–315
Pisidic 206
Pitch
  Amman 377
  Ancient Indian phonetics 372
  early experimental phonetics 414
  notation 390
  transcription 390
PIVOT (machine translation system) 441
Place
  Ancient Greek grammar 95
  case grammar 359, 361, 362
Pléiade 423
Pleonasm
  Ancient Greek grammar 92
    Apollonius 112
  Quintilian 109
PLNLP 442
Plosives, systems, Prague School 249
Poetry, Arabic 30
Polygenesis
  Ancient Greek grammar 84, 93
  comparative linguistics 199
Polyonymy 93
Polysemy, cognitive grammar 365, 367
Polysynthetic languages 215
Port-Royal grammatical tradition 169–174, 175–176
  background 169–170
  education 170–171
  Jansenist struggle against Jesuits 170
  works on language 171–174
Port-Royal Logic (Arnauld and Nicole) 172
Portuguese, Renaissance grammars 150
Position, Ancient Greek grammar 95
Positivism 222–223, 235
  phonetics 238
  rejection by Neolinguists 244–245
Possessives, Latin, solecisms 109
Postpositions, Apollonius 112
Poststructuralism, and history of linguistics 9
Praepositio 133
Pragmatics
  Arabic grammar 35
  generative semantics 232
  Geneva School 241
Prague School (Prague Linguistic Circle) 225–226
  functionalism 226, 290
  and language teaching 226
  markedness theory 226
  phonology 247–253
    phonemes 247–252
    phonological systems 248
  poetic language study 226
  realization of *langue* implications 238

  semantics 253–262
  standard languages 226
  syntax 253–262
Pratibhā 69
Prātiśākhyas 72, 73–74
Pre-reflective language 184, 185–186
Predicate, glossematics 268
Predicate raising
  generative semantics 343
  transformational grammar 332
Predicates
  Ancient Greek grammar 92, 94–95, 97, 111
  Aristotle 84
  functional grammar 292
  nominative case, Ancient Greek grammar 111
  Stoic grammar 85
  subcategorization, case grammar 353
Predicatives, valency grammar 284
Predicatoid 292
Prefixes
  Ancient Greek grammar 95
  Latin, early Roman Empire 109
Prepositional phrases
  applicational grammar 349
  place, Ancient Greek grammar 95
  valency grammar 283
Prepositions
  Ancient Greek grammar 92, 96
    Apollonius 112
  cognitive grammar 366
  Latin, early Roman Empire 108
  valency grammar 286
Presentism, history of linguistics 9, 10
Presupposition, Prague School semantics 258
Principles and Parameters theory 229
  and machine translation 441
Priscian 116–117
  commentaries, medieval 130–131, 132
    later Middle Ages 134
  influence, Middle Ages 132, 138
    early 122, 123, 128
  Institutiones grammaticae 89, 122–123, 128–129
Processing, language, Guillaumian linguistics 277, 278
Proemium, Modistic grammars 133
Programming Language for Natural Language Processing 442
PROLOG (machine translation system) 441
Prominence, cognitive grammar 365, 366
Pronomen 133
Pronominalization, transformational grammar 336–337
Pronouncing dictionaries, English 391
Pronouns
  anaphoric, transformational grammar 336–337
  Ancient Greek 92, 94, 96
    Apollonius 112, 113
    papyrus *technai* 100
  interrogative, Ancient Greek 112
  papyrus *technai* 99, 100
  relative, agreement, Ancient Greek grammar 111
Pronuciation, Biblical Hebrew 27
Pronunciation
  Biblical Hebrew 24
  French Renaissance linguistics 163–164, 166
  Quintilian 110
  Robinson and 374
  Vedas 72–73
Propositions
  Ancient Greek grammar 95
  case grammar 353
  Prague School 260
  semantics, medieval philosophy of language 140–141
  significate, medieval philosophy of language 141–142
  Stoic grammar 85
Propositors, applicational grammar 349
Prosodic analysis, Firth's views 269
Prosodic phonology 271
Prosody
  Ancient Greek grammar 100
  Ancient Indian phonetics 372
Proto-languages 196, 203
  Ancient Greek grammar 93
  'Indo-Hittite' 206
  Renaissance studies 150–151
Provençal, history 203
Psychology in linguistics 222
Psychomechanics
  Guillaumian linguistics 277
  syntax 279
Ptōsis 84, 92, 94, 95
Purport 264

Q-system formalism, machine translation 436
Qiè yūn 42, 43, 44
Quadripertita ratio 109
Quantifier lowering, generative semantics 345
Quantity, Ancient Greek grammar 94
Quechua, grammars 151, 158
Question test, Prague School 257, 259
Questions, Ancient Greek grammar 96
Quintilian 87, 107
  Institutio Oratio 109–110
Qur'an
  as source of linguistic data 29–30
  translation of 427

Raising, case grammar 356, 357
Rank, systemic theory 273
Ratio, Quintilian 109
Rational grammar, in Port-Royal grammatical tradition 169
Rationalism
  Alexandrians 87
  and general grammar 170
Rationalist linguistics, Spanish Renaissance 159
Rationality, and origin of language 185–186
Reading, Quintilian 110
Realism, post-Bloomfieldian phonology 312
Realization, systemic theory 273
Reason
  and origin of language 185–186
  Quintilian 109
Reasoning
  deductive, glossematics 263–264, 265, 266
  inductive 263, 266
Reconstruction
  comparative 199
    use of asterisk 199
  Grundriss 206

- Guillaumian linguistics 277
- phonological, historical linguistics 203–204
- presumed word-accent 204

Redundancy, Ancient Greek grammar 92
Reduplication
- Apollonius 112
- Herodian 114

Reference, tagmemics 317
Referent, Stoic grammar 85
Referential indices, generative semantics 346
Reflection, and origin of language 185, 186
Reflexivization, transitional grammar 337
Refutationism 11
Regency (*'amal*), Arabic lingusitic tradition 34–35
Regimen, later Middle Ages grammar 132
Register
- early Roman Imperial grammar 88
- metaregister 275
- and systemic theory 273–274, 275

Regularity, historical linguistics 204–206
Relatio, later Middle Ages grammar 133
Relativism, American structuralism 297
Relators
- applicational grammar 349
- functional grammar 292, 293, 294

Relevance, semantic framework 242
Renaissance
- grammatical writing 147–149
- lexicography 148, 149
- vernaculars 149–150

Renaissance linguistics 147–151
- France 161–166
- Italy 152–156
- Spain 157–161

Repetition, Apollonius 112
Representative function, Prague School phonology 252
Resonance, hierarchy 382
Restricted languages, context of situation 270
Result, case grammar 358, 360
Retroflexion, Ancient Indian phonetics 372
Ṛgveda 66, 73
Rhemes
- applicational grammar 351
- Prague School 254, 257

Rhetoric
- Ancient Greece 91
- *artes liberales* 107
- *rhetorica*, later Middle Ages 130
- study, early Middle Ages 127
- translation 420, 421

Rhotacism 109
Rhyme, Chinese phonetics 51, 52
Rhyme dictionaries, Chinese 51
- *Qièyún* 52, 53

Rhyme tables, Chinese 52–53, 55
- *Yùnjìng* 52, 56

Rhythm, speech, Steele on 378–379
Roman education 103
- grammatical textbooks 116–117
- influence in Middle Ages 122
- Quintilian and grammar 109–110

Roman language science
- *ars grammatica* 115–118
- Early Empire 87, 107–110
- early period to Varro 103–106
- Varro 86–87

Roman phonetics 373
Roman translation 420
Romance languages
- history 203
- influence of Latin 207, 208

Rosetta (machine translation project) 439
Rule ordering, transformations 328
Rules
- Ancient Greek grammar, Herodian 113
- *ars grammatica* 88
- cognitive grammar 367
- cross-linguistic comparison 198
- generative linguistics 207
- generative semanticists' conception 344

Runes, Germanic 180
Runic inscriptions 180, 183
Russian Formalism 225

Śabdabodha 71
Sabdatattva 69
Samāsa 61
Sāmaveda 74
Saṃnidhi 70
Sandhi 67, 73, 372
Sanskrit
- alphabet, formation 74
- comparative linguistics 188, 189, 191, 196, 197, 203
- copiousness 188, 189
- dictionaries 190
- discovery by Europeans 188–191
- grammar
  - maximal feature proximity 76
  - metarules (*paribhāṣā*) 60
  - morphology 62–64
  - suffixes 63
  - syntax 63–64
  - verbs 205
  - word-formation 62–63
- grammars (works) 188, 190
- influence on Japanese linguistics 46
- literature 190
  - Pons survey 188
- numerals 188, 189
- origin, theories 189, 190
- phonetics
  - ancient India 72–73, 371
  - descriptive techniques 75–76
  - origins 72–73
  - sound types 72–73
- phonology
  - consonants 73, 74, 75
  - Pāṇini 64–65
  - vowels 73, 75
- plosive system 249
- transliteration 190
- vocabulary, basic 189, 190
- writing systems 188

Sanskritocentrism 191, 196, 197
Sapir, Edward 207, 225
- American structuralism 295, 297–298, 304
- classification 215

Sapir-Whorf hypothesis 214, 225

American structuralism and 297, 298
Satellites, functional grammar 292
Saussure, Ferdinand(-Mongin) de 205, 233–239
  arbitrariness of signs 236–237
  Cours de linguistique générale 221, 224, 233, 240
  diachronic linguistics 233
  Geneva School and 239–243
  langue as a social fact 235
  langue versus *parole* 234–235
  linearity of signifiers 237
  primacy of spoken language 234
  semiology 235–236
  synchronic linguistics 233–234
  syntagmatic and paradigmatic relations 237–238
  systematicity of *langue* 238–239
Scale and Category Grammar 272, 275
Scandinavia, early historical and comparative studies 180–181
Scholasticism, medieval 131, 132, 135–136
Science
  and linguistics 221, 224, 232
    comparative 198, 199–201
    historical 227
  sociology of, linguistic historiography and 11–12
Scientific language, reduction to an algebra 264
Scientific revolutions 8, 11
Scotti peregrini 127, 128
'Scythian' 189, 196
Second instance 257
Segmentation, measurement 409, 410–412
Segments, dominant/recessive types 201
Semantic structure, generative semantics 343
Semantics
  Ancient Greek grammar 94
  Arabic 35
  categorematic terms, medieval philosophy of language 139
  cognitive 365
  componential, American structuralism 297
  encyclopedic 365
  functional grammar 294
  generative *see* Generative semantics
  Indian theories 67–70
  intensional, meaning and 260
  interpretive 229, 336–337
  later Middle Ages 131
  lexical
    case grammar 354
    stratificational grammar 323–324
  in machine translation 451
  Pāṇinian 66–67
  Prague School 253–262
  Priscian 89
  propositions
    medieval philosophy of language 140–141
    significate 141–142
  'relevance' 242
  situation, applicational grammar 350–351
  structuralism 223
Sememes
  American structuralism 300
  stratificational grammar 320, 322, 323, 325
Semiological level of language, constructivist conception 242
Semiological linguistics, Geneva School 242
Sémiologie 236
Semions 349
  fusion 351
Semiotics 232
  Ancient Greek grammar 95
  langue in 235–236
  poststructural, influence on systemic theory 275
Semitic languages, comparative studies 27
Semivowels
  Aristotle 84
  Roman phonetics 373
Semotactics 320, 322
Sense, Prague School semantics 260
Sentence formation, Bloomfield 301
Sentence-tokens, medieval philosophy of language 141
Sentence-types, identification 83, 84
Sentences
  American structuralist theory 299
  Ancient Greek grammar 91, 92, 94, 95, 96, 100
    Apollonius 112
  applicational grammar 348, 350
  complex, Ancient Greek grammar 95, 97
  construction, Modistae 134
  dictum 241
  falsifiable, Ancient Greek grammar 96
  functional perspective 254
  generative semantics 343
  glossematics 267
  hypersentences, illocutionary force 345
  kernel 330
  meaning, Indian theories 67–69, 70
  modus 241
  sentence patterns, Prague School 253–254, 255
  types
    Ancient Greek grammar 91, 94, 95, 96–97
    and illocutionary force 92, 95, 96
    propositions 141
  and utterances, distinction 253–254
Septuagint 420
SERNA 434
Shi jing 44
Shift, language, comparative linguistics 200
Shortening, Ancient Greek grammar, Herodian 114
Shorthand, notation 389, 393
Siddham studies 46
Siddhanta-Kaumudi (Bjattoji Diksita) 60
Sidetic 206
Sign theory, Geneva School 242
Significate 141–142
Significatio 139
Signification
  later Middle Ages grammar 132
  medieval philosophy of language 141–142
  properties of terms 139
Signifieds
  in *langue* 236
  relations with signifiers 224
  Stoic linguistics 85, 96
Signifiers
  in *langue* 236
  linearity of 237
  relations with signifieds 224
  Stoic linguistics 85, 96

- Sign(s)
  - arbitrariness 224
    - Ancient Greek grammar 84, 92, 95, 101
    - in Greco-Roman tradition 83
    - relative 236
    - Saussure on 236–237
  - Augustine theory 138
  - expression of mental feelings 95
  - glossematics 290
  - value 237
- *Signum* 133
- *Śikṣās* 72, 73–74
- *Similitudo* 87
  - *figura* (*vox*) 104
  - *materia* (*res*) 104
  - Varronian linguistics 104, 105
- Simplification, generative linguistics 207–208
- Singular, functional grammar 293
- Sino-Japanese 56
- Situation, context of, Firth 269–270
- Situation semantics, applicational grammar and 350–351
- Slavic languages, differentiation, socio-geographic 196
- Slovak, literary, vowel system 248
- Smart Corporation, machine translation systems 437, 450
- Smithsonian Institution, phonetic transcription 400
- Social adjustment, speech 208–209
- Social behaviorists 235
- Social class, speech variation 208
- Social imitation 209
- Social networks, language variation 209
- Social process, language as, and systemic theory 273
- Société genevoise de linguistique 241
- Society, language communication needs 185, 186
- Society of Jesus 151
- Socio-historical linguistics 232
- Socio-historical phenomenon, language as 242
- Sociolects, Spanish Renaissance linguistics 160–161
- Sociolinguistics 230–231
  - historical linguistics 208–209
  - and language change 205
  - *langue* 235
  - prestige speech-forms 208
- Sociology, positivism in 223
- Solecisms
  - Ancient Greek grammar 84, 91–92, 94, 99, 111
    - Apollonius 112
  - Arabic grammar 28–29, 30
  - *ars grammatica*, Priscian 117
  - Latin, early Roman Empire 108, 109
- Sonographs 419
- Sonority, scale 406
- Sophismata (works), 13th century 131, 139
- Sophists 90, 91
- Sound changes, historical linguistics 203–204
- Sounds
  - nonpermutable 250
  - permutable 250
  - speech
    - articulatory description 404–408
    - letters and 402
    - transitional 407
    - variability 295
- Source, case grammar 359, 362
- Spain, Renaissance linguistics 157–161
- SPANAM (machine translation system) 437, 448
- Spanish
  - dialects and sociolects 160–161
  - dictionaries
    - first 158, 160–161
    - Latin–Spanish 157–158
  - grammar, Renaissance linguistics 157–159
  - grammars (works), Renaissance 150, 158–159
  - historical linguistics, Renaissance 160
  - orthography 150, 159–160
    - standardization 160
  - Renaissance linguistics 157–160
  - Castilian Spanish 160
    - Renaissance linguistics 157
- Speaker, Guillaumean linguistics 279
- Speaking, ethnology 231
- Speaking machines 417
  - Kempelen and 380, 402–404
- Spectrographs 419
- Speculative grammar 169
  - later Middle Ages 130, 131, 132, 135
  - Spanish Renaissance linguistics 157, 159
- Speech
  - analysis
    - distinction from speech synthesis 406–407
    - early instrumental 408
  - audience sensitivity (solidarity) 101, 208
  - cognitive act, Ancient Greek grammar 95
  - linearity and functionalism 291
  - measurement, history 408–413
  - physiology
    - and articulatory phonetics 402–408
    - nineteenth century 381–383, 402–408
  - process, Ancient Indian phonetics 371
  - situation sensitivity (formality) 208
  - social adjustment 208–209
  - sounds *see* Sounds, speech
  - visible 396–397
  - *vitia virtutesque orationis* 87, 108
- Speech communities, language change 208
- Speech curves, graphic registration 408–413
- Speech organs
  - Chinese linguistics 43
  - early descriptions 374
    - Ancient Indian 371
    - nineteenth century 385
    - seventeenth–eighteenth centuries 374, 375, 376, 377, 379
- Speech production, von Kempelen and 380
- Speech situations, situational functions 252
- Speech synthesis
  - distinction from speech analysis 406–407
  - early experiments 380, 402–404, 406–407
  - historical examples 417–418
- Speech technology, historical antecedents 416–419
- Spelling
  - reform
    - Middle Ages 373
    - shorthand and 393
    - transcription and 391
  - *see also* Orthography
- Spoken language
  - affectivity 240
  - and functionalism 291, 295

  inconsistency, historical linguistics 208
  linearity 237
  machine translation 443
  primacy of, Saussure on 234
Stadialism 227
Standard languages, Prague School 226
Standardization of language
  French 165–166
  Italy 152
  Renaissance 152, 165–166
Statements, structural, glossematics 263
Stemmas, valency grammar 281, 282
Stoics
  dialectic (logic) 85
  dual patterning 92
  etymology 124
  grammar 85–86
  on language 95–98
Stoikheia 372
Stomatograms 404
Stop consonants
  Ancient Greece 372
  Ancient Rome 373
  aspirated, Aristotle 84
  Latin, early Roman Empire 109
  syllabaries 90
  technai 100
  voiced, Ancient Greek grammar 94
Stratificational grammar 228, 320–326, 435
  active/passive sentences relationship 321–322
  finite state node 324–335
  lexical semantics 323–324
  lexotactics 320, 322
  linguistic processes 321
  micro-notation 325
  network of relations 320, 321
  performance models 324–325
  raising 322
  realizational structure 320, 322
  spreading activation 325
  strata 320–321, 325
  syntax 321–324
Stress
  contrastive, glossematics 267
  notation 390
Structural statements, glossematics 263
Structuralism 4, 224–225
  abstraction 225, 226
  algebraic 227–228
  American *see* American structuralism
  Copenhagen School 226
  features 225
  form vs meaning 225, 226
  Geneva School of Linguistics 224, 242
  London School 226
  Prague School 225–226
  syntax studies 228
  systematicity of *langue* in 238–239
  wider influence of 239
Structure
  Alexandrians 87–88
  Firth 271
  immanent, of languages 265
Style
  Ancient Greek grammar 101
  early Roman Imperial grammar 88
  Quintilian 109
  Renaissance linguistics 148
Stylistics
  ars grammatica 88, 115, 118
    Quintilian 109
  Geneva School 240–241
STYLUS (PC translation system) 443
Subcategorization, case grammar 353
Subjacency condition 339–340
Subject
  Ancient Greek grammar 92, 94
  case grammar 353–354
  cognitive grammar 367
  finite verbs, Ancient Greek grammar 111
  functional grammar 292, 294
  glossematics 268
  Guillaumian linguistics 279
  valency grammar 281, 284
    counter-subjects 284
Subjunctives
  Guillaumian linguistics 278
  Varronian linguistics 106
Substance
  functional grammar 290
  glossematics 290
Substitution
  Ancient Greek grammar 92, 94, 101
    Herodian 114
  in Greco-Roman tradition 83
  Quintilian 109
  syntactic relationships 241
  transformational grammar 328
Subtraction
  Ancient Greek grammar 92, 101
  Quintilian 109
Sumerian
  grammar, word lists 19–20
  lexicons 19–20
  morphology 21
  verbs 20
  writing system, administrative texts 19
Summer Institute of Linguistics 228, 427
  tagmemics 315
Super-proto-language, 'Indo-Hittite' 206
Superlatives, Latin, solecisms 109
Suppletion, case grammar 353
Supposition, properties of terms 139, 140
  types of supposition 139–140
Suppositum, later Middle Ages grammar 132
Suprasegmentals 230
  American structuralism 300–301
  history
    eighteenth century 378–379
    nineteenth century 385
  notation 390
Surface structure
  case grammar 353
  Spanish Renaissance linguistics 159
  transformational grammar 327, 333
Surmise, Ibn Janah 24
SUSY (machine translation system) 438
Sūtras 68

Swedish, dialect alphabet 398
Syllabaries
  Ancient Greek 90
  Cypriote 90
  phonetic, nineteenth century 392
  stops 90
Syllables
  Ancient Greek grammar 92
  Ancient Greek phonetics 373
  Ancient Indian phonetics 372
  Aristotle 84
  Bloomfieldian/post-Bloomfieldian phonology 306, 310
  duration, measurement 410–413
  glossematics 267
  resonance theory 383
  sonority 406
Syllemma, functional grammar 293
Symbolization, cognitive grammar 365
Synaesthesia, origin of language debate 186
Syncategorematic words 138–139
Synchronic linguistics 235
  Geneva School of Linguistics 240
  Saussure on 221, 224, 233–234
Syncretism, functional grammar attitude 290
Synonyms/Synonymy
  American structuralism 303
  Ancient Greek grammar 91, 92
  applicational grammar 351
  Prague School semantics 260–261
Syntactic categories
  case grammar 359
  generative semantics 343, 347
Syntactic function, applicational grammar 349
Syntactic relations, Geneva School 241
Syntactic structure, building, case grammar 357
Syntagmatic relations
  American structuralism 304
  Firth 271
  glossematics 266
  Saussure on 237–238
Syntagmemes 318
Syntax
  Alexandrians 88
  American structuralism 299–301
  Ancient Greek grammar 92, 94–95, 111–113
    Sextus Empiricus 102
  ars grammatica, Priscian 117, 128
  autonomy 229
  correct, Ancient Greek grammar 111
  descriptive, Geneva School 241
  ergative
    Guillaumian linguistics 279
    historical linguistics 207
  French Renaissance linguistics 162–163
  Guillaumian 279
  Italian Renaissance linguistics 155
  in medieval scholasticism 131–132
  Modistae 132–133, 134
  Neogrammarians 222
  Prague School 253–262
  Priscian 89
  psychomechanics, Guillaumian linguistics 279
  Renaissance 147, 148, 149
  structuralism 228
  Varronian linguistics 104, 122
Synthemes 291–292
Synthetic languages 213, 214
Systemic linguistics 226, 231
Systemic ordering, Prague School 258
Systemic Theory 272–276
  concepts 273
  development 274–275
  influences and trends 275
  levels 273
  system networks 272
Systems
  Firth 271
  polysystemic approach 271
  reconstruction, Guillaumian linguistics 277
  systemic theory 272–273
SYSTRAN (machine translation system) project 437, 443, 448, 450

T-strain 195, 197, 214
  first Indo-European monograph 213
  organic/mechanical distinction 199
Tactics, stratificational grammar 320, 321
Tagalog, description 298–299, 301
Tagmemes 314, 318
  American structuralism 300
  cohesion 318
  and constructions 317, 318
  form and meaning units 318
  in grammar 318
  semantic role 318
  two-part vs. four-part 315
Tagmemic formulae 319
Tagmemics 226, 228, 301, 314–319
  applications 319
  basic assumptions 315–316
  constituent structure 316
  context 316
  function slot/filler class in 318
  hierarchies 316–318
  historical development 314–315
  notation 318–319
    obligatory/optional constituents 319
  observer perspectives 315
  units 316
Talking heads 417
Tamil, linguistic tradition 77–79
Taqdir 24
Tarascan, grammars (works) 158
Tātparya 70
TAUM (machine translation system) 436, 448
TAUM-AVIATION (machine translation system) 448
TAUM-METEO (machine translation system) 436, 448
Taxemes, American structuralism 300
Taxonomies
  Ancient Greek grammar 84
  Varronian linguistics 104
Teaching language
  methods, constructive 241
  mother tongue, Geneva School 241
  phonetics and 386, 387
  Port-Royal methods 171–172, 173
  Prague School 226
Technai 83, 94, 99–100

  - papyrus 99
- *Techne grammatike* 86
  - *grammatike* 94
  - parts of speech in 86
- Tectogrammatical representations, Prague School 256, 258
- *Tekhne grammatike* 372–373
- Telecommunications, machine translation systems 442, 443
- Telephone, machine translation systems 442
- Telugu, writing system 188
- Tense(s)
  - agreement, Ancient Greek, Apollonius 112
  - Ancient Greek grammar 94, 95, 97, 98
  - Guillaumian linguistics 278
  - present, functional grammar 292–293
  - Varronian linguistics 104, 105
- Terminism, medieval philosophy of language 138–140
- Terms
  - applicational grammar 348
  - properties of *see* Terminism
- Texas University, Linguistics Research Center 434–435, 449
- Text, systemic theory 273
- Theme
  - applicational grammar 350
  - Prague School 254, 257
- *Théorie des aires*, Guillaumean linguistics 278
- Thought, rational, origin of language debate 185–186
- Time
  - Ancient Greek grammar 95
  - case grammar 361
  - Guillaumian linguistics 278
- TITUS (machine translation system) 437
- Tocharian languages 206
- Tokens, comparative linguistics 200
- *Tolkāppiyam* 78
- Tone languages, transcription 390
- Tone(s)
  - Ancient Greek phonetics 373
  - Ancient Indian phonetics 372
  - Chinese 52
  - notation, Korean/Chinese 56
- Topic/focus articulation, Prague School 254, 257–259
- Topics
  - operational test, Prague School 258–259
  - Prague School 254, 257, 258
- Tovna (machine translation system) 441
- Tower of Babel 150, 152, 189
- Traces
  - in Revised Extended Standard Theory 229
  - transformational grammar 340–342
- Traditional grammar, accidents 134
- Traduction Automatique de l'Université de Montréal (TAUM) 436, 448
- Transcription 388
  - allophonic 389
  - broad 389
  - Copenhagen Conference (1925) 400
  - history 388–401
    - pre-nineteenth century 390–392
    - nineteenth century 392–400
    - twentieth century 400–401
  - impressionistic 389
  - machine readable 400–401
  - narrow 389
  - notations
    - alphabetic 389, 390–392
    - analphabetic 389, 397–398
    - diacritics 390, 392, 393, 395, 398, 400
    - digraphs 390, 391, 395
    - Greek letters in 390, 391, 396, 397, 400
    - iconic 389, 391, 392, 396
    - musical staff 396, 397–398
    - new symbols 390, 391, 395, 398
    - nonsegmental aspects of speech 390
    - organic 389
    - principles 389
    - roman-based 389–392, 394–395, 396
    - shorthand 393
    - typefaces in 390, 394, 398
  - phonemic 309, 389, 400
  - principles 398, 400
  - systematic 389
- Transformational grammar 228–229, 326–342
  - abstractness of underlying representations 330
  - early development 326–330
    - Chomsky 327–338
    - Harris 326–327
  - Extended Standard Theory 335–342
  - generative semantics 332–335
  - interpretive semantics 336–337
  - lexical insertion 332–333
  - lexicalist hypothesis 335–336
  - morphophonemic rules 328
  - phrase structure rules 328
  - pronominalization 336–337
  - raising 332
  - recursion 329, 330
  - rule interaction 331–332
  - semantic interpretation 332–333
  - Standard Theory 330–332
  - structure preservation 337–338
  - T-markers 330
  - trace theory 340–342
  - transformational cycle 331–332, 336
  - transformations 326, 328–329
- Transformations
  - A-over-A principle 340
  - applicational grammar 350
  - blind application 338–340
  - complementizer deletion 332
  - complementizer placement 331
  - 'Control' 339
  - derivational constraint 334
  - derived constituent structure 327, 331
  - 'Each' movement 338, 339
  - elementary 328
  - equi NP deletion (identity erasure) 331–332, 337
  - generalized 329, 331
  - island constraints 339–340
  - It-deletion 333
  - local 337
  - movement constraints 337–340
  - Neg Lowering 333
  - nominalization 329, 335–336
  - obligatory/optional 329–330
  - passive 328, 336

  predicate raising 332
  and processing complexity 330
  quantifier lowering 334
  reciprocal interpretation 341
  root 337
  rule ordering 329
  singulary 328, 330
  Specified Subject Condition 339
  structural analysis (description) 327–328
  structural change 327–328
  structuralism 229
  structure preserving 337
  subjacency 339–340
  Tensed-S Condition 338
  in transformational grammar 326, 328–329
  wh-movement rule 339, 341
Transformations (*pathē*)
  Alexandrians 88
  Ancient Greek grammar 84, 92, 94, 101
    Apollonius 112
    Herodian 113
  in Greco-Roman tradition 83
Transitio, later Middle Ages grammar 132
Transitivity, crosslinguistic 201
Translation
  Bible *see* Bible, translation
  Christian 420, 421, 422, 424, 428
    missionaries 427
  colonialism and 427
  computer-aided 431, 438
  educational
    Age of Reason 425
    humanist 423
  fully automatic high quality (FAHQ) 435, 447
  functions, historical view 423
  Greek to Latin 420
  history 419–430
    classical period 419–420
    Middle Ages 420–421
    Renaissance and humanism 421–423
    Age of Reason 423–425
    nineteenth century 425–427
    twentieth century 428–430
  human-aided machine 431
  Interlinearversion 425
  into vernaculars 421
  Italian Renaissance linguistics 155–156
  literal, condemnation 420
  literary
    Age of Reason 423
    classical period 420
    Middle Ages 421
    nineteenth century 425–426
    Renaissance 423
    romanticism and 425–426
    symbolist influence 429
    theories 429
    twentieth century 429
  machine 431–445
    ALPAC report 435–436, 447–448
    artificial intelligence and 439–440
    commercial 443
    computer-aided 431, 438
    controlled languages 431, 441, 444
    corpus-based methods 440–441
    dialog-based 442
    direct 431, 432
    example-based 440
    fulcrum method 434
    history 432–451
    human-aided 431
    interactive 450
    interlinguas in 431–432, 435, 437, 439, 441
    knowledge-based 439, 441, 450
    lexicalist approaches 442
    meaning-text model 435, 437
    microcomputers 438, 443
    multilingual generation 442
    North America 444–451
    postediting 431, 445
    pre-editing 431, 445
    rule-based 440, 441–442
    semantics in 451
    source language analysis 432
    spoken language 442
    statistical methods in 433, 440
    syntactic transfer method 436
    synthesis in 432
    systems 431–432, 435
    systems learning in 441
    target languages 431, 442
    telecommunications 442, 443
    terminology 431–432
    transfer in 432, 439
    use in 1990s 443–444
    word-for-word 433, 445
  machine-aided human 431
  musical texts 426, 429
  parody 425
  religious
    classical period 419–420
    Middle Ages 421
    Renaissance and humanism 422
    Age of Reason 424
    nineteenth century 426
    twentieth century 428
  rhetorical theories 420, 421
  schools of 421–422
  scientific
    classical period 420
    Middle Ages 421
    Renaissance 422
    nineteenth century 426–427
  technical
    classical period 420
    Middle Ages 421
    Age of Reason 424–425
    nineteenth century 426–427
    twentieth century 428–429
  theory/theories 429–430
  training 428–429
TranslationManager 441
Translations memory 443
TRANSLATOR (machine translation system) 450
Translator workstations 441, 443
Translators
  computer assistance for 443
  modern profession 428

  training 428–429
Transliteration 388
  Asian and oriental languages 392
Transparency 208
Transposition
  Ancient Greek grammar 91, 92, 94
    Apollonius 112
    Herodian 114
  early Roman Imperial linguistics 109
Tree diagrams, phrase structure 229
Tree pattern of language descent 198
Trilaterality, Hebrew 23
Trills 376
Truth
  illocutionary forces, Ancient Greek grammar 95
  propositions, medieval philosophy of language 141
Turkish, vowel system 248
Tuscan, Renaissance linguistics 150, 153, 154, 155
Twentieth-century linguistics, overview of trends 221–233
Types, comparative linguistics 200
Typewriters/Typewriting, phonetic 419
Typology
  algebraic notation 214
  alignment, historical linguistics 207
  applicational grammar and 351
  classical 213, 214
  evolution, Guillaumian linguistics 278
  historical linguistics 209
  history of 212–216
  implicational, and language universals 215–216
  nineteenth century studies 197
  phonological, post-Bloomfieldian 310
  psychological linguistics 222

ULTRA (machine translation system) 441
Umlaut, historical linguistics 204
Unaccusative hypothesis, case grammar 354
Undergoer, macrorole 362
Underlying forms, transformational grammar 333
Unification grammar, and machine translation 439
Uniformitarianism, historical/comparative linguistics 199, 205
UNITRANS (machine translation system) 441
Universal grammar 326
  Chomsky on 228, 229
  later Middle Ages 131
  origin of language debate 186
Universal languages, 17th century British schemes 174–178
Universal–Typological linguistics 231
Universals
  absolute 231
  functional grammar 291
  Greenberg 216, 231
  implicational 231
    typology 216
  Port-Royal grammatical tradition 172–173
  seventeenth century theories 175
  Varronian linguistics, *declinatio* 104
Upadhmānīya 75
Usage
  Ancient Greek grammar 99–100, 101
  and correctness, early Roman Imperial grammar 88
  Quintilian 110
  Varronian linguistics 105
Utterances
  content, Geneva School 241
  modality, Geneva School 241
  and sentences, Prague School 253–254

Vakyapadiya (Bhartrhari) 60, 69–70
Valency 280–281
  origin of term 280–281
  Prague School 255–257
Valency grammar 280–289
  actants and circonstants 281–283
  active/passive sentences 284
  adjective phrases 283
  adjectives 287–288
  adverbial 281–282
  clausal complementation 288
  dictionaries 288
  elaborators
    diversity 283–284
    verb 282
  embedded clauses 288
  free modifiers 282–283
  levels of syntactic analysis 284
  limits 288–289
  nouns 286–287
  object 281, 284, 285
  predicates 284
    clefting 284
  prepositional phrases 283
  prepositions 288–289
  subjects 281, 284
    counter-subjects 284–286
    deep/underlying 285
  Tesnière's approach 281
  verbs 281, 286–287
    causative constructions 286–287
    meterological 285–286
    reflexive 286
Variation, linguistic
  Ancient Greek grammar 101
  early Roman Imperial grammar 88
  morphological variation (*Declinatio*) 87, 104
  social class and 208–209
Varieties of language, concurrent, Neolinguists' denial of 246
Varro, Marcus Terentius 86–87, 104–106, 122
  abstract models 87, 104
  De Lingua Latina 86, 149
  derivational/inflectional morphology 86–87
  on etymology 86
  grammatical methods 105–106
  linguistic theory 104–105
  linguistic works 104
    De Lingua Latina 104
Vedas
  injunctions 68
  interpretation of meaning 66, 68–69
  phonetic studies 72–73
  pronuciation 72–73
  pronunciation 72–73
Ventriloquism 417
Verb phrases
  Guillaumian linguistics 278

  - role, Plato 84
- Verbal systems, analysis, Guillaumian linguistics 277
- Verbals *see* Adjectives, verbal
- Verbmobil, machine translation project 443
- Verbs
  - accidental modes, later Middle Ages grammar 132
  - Ancient Greek grammar 92, 95, 97
    - abstract underlying forms 112
    - Apollonius 112
    - extra meanings 112
    - impersonal transitive/intransitive 112
    - papyrus *technai* 100
    - personal transitive/intransitive 112
  - Aristotle 84, 85
  - case government, Ancient Greek 94
  - classification, Ancient Greek grammar 97
  - cognitive grammar 367
  - ergative, case grammar 354
  - functional grammar 292–293, 294
  - functions, applicational grammar 348
  - future perfect indicative, Varronian linguistics 106
  - Hebrew 23
  - impersonal, Greco-Roman tradition 89
  - Latin
    - accidence, taxonomy 109
    - early Roman Empire 108, 109
  - meteorological, valency 285–286
  - Prague School studies 254
  - reflexive, valency grammar 286
  - roots, historical linguistics 189, 204, 205
  - sentence construction, Modistae 134
  - Stoic grammar 85
  - valency 281, 286–287
    - meterological verbs 285–286
    - reflexive and causative patterns 286
  - Varronian linguistics 105–106
- *Verbum* 133
- Vernacular(s)
  - early historical and comparative studies 180
  - in education in Renaissance France 171
  - Renaissance linguistics 149–150
    - Italian 152
    - Spanish 160–161
- *Vetustas*, Quintilian 109
- *Vidhi* 68
- *Viracoliyam* 78
- *Visarga* 75
- Vivarium 420
- Vocabulary
  - Ancient Greek grammar 92
  - linguistic, Dionysius Thrax 101
  - standardized, origin of language debate 185
- Vocal cords (folds), early descriptions 378
- Vocal organs *see* Speech organs
- Vocative case, Ancient Greek 96
- Vocoders 419
- Voice (grammar)
  - Ancient Greek grammar 95, 97
  - Stoics 85
- Voice offset time, experimental phonetics 410
- Voice onset time, experimental phonetics 410
- Voicing
  - ancient Indian phonetics 75
  - consonants, measurement 410
  - early descriptions
    - Ancient Greek phonetics 372
    - Ancient India 371
    - Robinson 375
    - seventeenth and eighteenth centuries 376, 377, 378
- *Völkerpsychologie* 234
- Volney Prize 392–393
- Vowels
  - Ancient Greek, Apollonius 112
  - Aristotle 84
  - cardinal 384
  - classification 372, 375
  - color theory 381
  - diagrams 375, 380
    - du Bois-Reymond 383
    - quadrilateral 385
    - triangle 379, 381, 382
  - early descriptions
    - Ancient Greece 372, 373
    - Ancient India 372
    - nineteenth century 379, 381, 382, 384, 385, 386
    - sixteenth–seventeenth centuries 373, 374, 375, 376, 377
  - formant resonances 378
  - formants 380, 381
  - glossematics 267
  - guttural 375
  - labial 372, 374, 375
  - Latin, early Roman Empire 109
  - lingual 374
  - lost 'co-efficients', historical linguistics 205
  - mixed 377, 384
  - narrow 384, 385
  - neutral 372, 381, 382
  - palatal 372, 375
  - physiological formation 380
  - primary 384
  - production 380–381
    - harmonic theory 381
    - inharmonic (transient) theory 381
    - instrumental phonetics 404
  - synthesis, early experiments 380–381, 417
  - systems, typology 248
  - weak forms 373
  - wide 385
  - writing systems, Ancient Greek 90
- *Vox* 133
- *Vyañjana* 70

- WCC systems, machine translation 438, 449
- Weidner Communications Corporation (WCC) (later World Communications Center) 438, 449
- *Weltanschauung* and language, structure 214
- *Wh*-movements, transformational grammar 339, 341
- Whig-histories 6, 8, 10
- Whispers/Whispering, production 375
- Whistles/Whistling 378
- Will, human, in language production 227, 234
- Word-classes
  - analysis, Wilkins' *Essay* 177
  - Arabic grammar 33
  - Latin, *ars grammatica*, Latin 115
  - Modistic grammar 132, 133–134
  - origin of language debate 186

primary and secondary functions, applicational grammar 348–349
Word-formation
  Arabic grammar 33
  Bloomfield 301
Word order
  Ancient Greek grammar 94
  deep 258
  valency grammar 281
Words
  Ancient Greek grammar 96
  Arabic grammar 33
  Biblical Hebrew 24
  classification
    ars grammatica 116
    Quintilian 109
  definitions, Ancient Greek grammar 100
  functional, Ancient Greek grammar 92
  glossematics 268
  Guillaumian linguistics 278
  meaning, Indian theories 66–67, 69–70
  Semitic languages 22
  syncategorematic, medieval philosophy of language 138–139
  universal language schemes, 17th century 174–175
  Varronian linguistics 104
World view and language structure 214
Writing systems
  alphabetic 42
  Chinese 42
  ideographic, double articulation 291
  Japanese 45–46, 56
  Korean 53–54
  Semitic languages 22
  vowels in, Ancient Greek 90
Written language
  functionalism 295
  marginalization, formalization by Saussure 234
  secondary representation characterization 225
Wycliffe Bible Translators 228, 426

X-bar theory 335, 347
X-rays, articulatory phonetics 405
XTRA (machine translation system) 451

Yajurvedas 73–74
Yogyatā 70
Yu pian 42, 43

Zend 190
Zero forms, functional grammar 293
Zipf's law 200–201
Zulu, transcription 394

Index of Biographical Names

[*Names listed in bold type are contributors to this volume*]

A

Ablancourt, Nicholas Perrot d' (1660–1643) 423
Abu ᶜAlī al–Fārisī, *see* al-Fārisī
Acarisio, Alberto (1497?–1544?) 155
Adelung, Johann Christoph (1732–1806) 179, 187, 188, 190, 196, 197, 212
Aelfric (9th cent A.D.) 128
Agricola, Rudolphus (1443/44–1485) 138
Akattiyaṉ (largely mythical Tamil sage) 77,78
al-Bustaānī, Butrus (1819–1883) 36–37
al-Faāsī, David b. Abraham (*alias* Abū Suleimān Dāwud ibn Ibrahīm al-Fasī, mid-10th cent. A.D.) 22, 23
al-Fārisī, Abū ᶜAlī al-Ḥasan Ibn Aḥmad (d.377/987) 33, 34
al-Jawharī, Ismaᶜil (d.1003) 36
al-Khalīl, Ibn Ahmad (d.791 A.D.) 28, 29, 33,36
Alarcos Llorach, Emilio (b.1929) 263
Albert of Saxony (c.1316–1390) 140
Alberti, Leon Battista (1404–1472) 149, 153, 154, 155
Albertus Magnus (Albert, *Graf* von Bollstädt, 'Doctor universalis', c.1193–1280) 131, 134, 141, 417, 422, 424
Albrecht, Jörn (b.1939) 243
Alcuin (of York, *abbot* of Tours, c.735–804) 126, 127, 128
Aldhelm (c.700 A.D.) 128
Aldrete, José de (1560–1641) 160
Alemán, Mateo (c.1547–1614) 160
Alexandre de Villedieu (= Alexander de Villa-Dei, c.1170–c.1250) 130, 148
Alfred, King ('the Great', 848–899 A.D.) 183, 421
Allerton, David J(ohn, b.1947) 280, 281
Alter, Franz Carl (1749–1804) 190
Althusser, Louis (1918–1990) 239
Alunno, Francesco (1484?–1556) 155
Amacker, Réné (b.1942) 239, 242
Amaduzzi, Giovanni Cristoforo (1740–1792) 190
Amarasiṃha (4th cent A.D.) 190
Amyot, Jacques (1513–1595) 423
Anbāri (d.1181) 30
Anderson, John M(athieson, b.1941) 352, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363
Andre'ev, Nikolaj D(imitri'evič, b.1915) 435
Annen (841–915 A.D.) 46
Anquetil-Duperron, Abraham Hyacinthe (1731–1805) 188–189
Anselm of Canterbury (1033–1109) 138, 139, 142
Antipater (fl. 2nd cent. A.D.) 96
Apollonius Dyscolus (c.110–175 A.D.) 87–88, 89, 91, 92, 94, 96, 97, 98, 100, 101, 111–115, 117, 128, 149
Apresjan, Jurij D(renikovič, b.1930) 439
Aristarchus (of Samothrace, c.217–c.145 B.C.) 85, 96, 99, 109, 113
Aristippus, Henricus (*archdean* of Catania, c.1100–1170) 421
Aristophanes (of Byzantium, c.257–180 B.C.) 85, 99, 113
Aristotle (of Stageria, 384–322 B.C.) 26, 69, 84–85, 88, 91, 92, 93–99, 100, 101, 102, 111, 127, 134, 137, 138, 141, 142, 149, 156, 159, 169, 176, 235, 236, 372, 420, 421, 422
Arnauld (*or* Arnault), Antoine (1612–1694) 169, 170, 171, 172, 173, 175
Arnold, Matthew (1822–1888) 425, 426
Artsrouni, Georges (20th cent.) 433
Āṟumuka Nāvalar (1822–1879) 78
Asclepiades (of Myrlea, 1st cent. B.C.) 102
Asher, R. E. (b.1926) 41
Ashmole, Elias (1617–1692) 424
Asper (c. 4th cent A.D.) 117
Asper (c. 600 A.D.) 123, 124, 127
Aston, William G. (1841–1911) 49, 50
Auden, Wystan Hugh (1907–1973) 429
Augustinus, Aurelius, St. (354–430 A.D.) 88, 115, 122, 123, 124, 127, 138, 141, 142
Aulus Gellius, *see* Gellius, Aulus
Aurispa, Giovanni (c.1375–1459) 149
Austin, John Langshaw (1911–1960) 92
Avicenna (ibn Sina, 980–1037) 142

B

Bacon, Francis (*Lord* Verulam and *Viscount* St Albans, 1561–1626) 176, 177, 424
Bacon, Roger, *see* Roger Bacon
Balbi, Antonio (1781–1848) 196
Balmont, Konstantin Dmitri'evič (1867–1943) 429
Bar-Hillel, Yehoshua (1915–1975) 433, 434, 435, 445, 446–447
Barclay, Alexander (1475?–1552) 150
Barthélémy, Jean-Jacques (1716–1795) 189
Barthes, Roland (1915–1980) 239
Barton, John (fl.1410) 150

Barzizza, Gasparino (1360–1430) 147–148
Batteux, Charles (de, 1713–1780) 423
Baudelaire, Charles (1821–1867) 426
Baudoin, Jean (1564–1650) 423
Baudouin de Courtenay, Jan (Ignacy Niecisław, 1845–1929) 236, 238, 247
Bayer, Gottlieb Siegfried (1694–1738) 189
Beauzée, Nicolas (1717–1789) 174, 188, 189, 190
Becker, Carl L(otus, 1873–1945) 10
Becker, Karl Ferdinand (1775–1851) 197
Bede, The Venerable (673–735 A.D.) 125, 180
Bedell, William (1571–1642) 183
Bedingfield, *Sir* Thomas (d.1613) 423
Behaghel, Otto (1859–1936) 201
Bell, (Alexander) Graham (1847–1922) 417, 418
Bell, Alexander Melville (1819–1905) 222, 376, 383, 384, 385, 386, 387, 394, 396, 397, 401, 402, 404, 406
Bellot, Jacques (fl.1580–1590) 163
Beltran, Sergio F. (2nd half of 20th cent.) 446
ben Hanesi'ah, Moses ben Isaac (13th cent.) 25
ben Labrat, Dunash (mid-10th cent.) 22, 23
ben Saruḳ, Menaḥem (mid-10th cent.) 22–23
Ben-Asher, Aharon (10th cent.) 22
Ben-Bal'ām, Yehuda (*alias* Abū Zakariyyā Yaḥyā ibn Bal'ām, 2nd half of 11th cent.) 25
Benevoglienti, Bartolomeo (d.1486) 152, 153
Benfey, Theodor (1809–1881) 3, 4, 5, 6, 206
Benjamin of Cambridge (12th–13th cent.) 23
Benjamin, Walter (1892–1940) 429
Bennett, David C. (b.1936) 320
Bennett, Winfield S(cott, III, b.1946) 449
Benveniste, Émile (1902–1976) 205, 226, 237, 238, 263
Bertalanffy, Ludwig von (1901–1971) 239
Bèze, Théodore de (1519–1605) 163, 422
Bhartṛhari (5th cent. B.C.) 60, 69, 70
Bibliander, Theodor (*alias* Buchmann, 1504–1564) 151, 196, 427
Biffi, Giovanni Ambrogio (fl.1606) 156
Bignon, *abbé* Jean-Paul (1662–1743) 188
Binet, Alfred (1857–1911) 411
Binnick, Robert I(ra, b.1945) 343
Biondo, Flavio (of Forli, 1392–1463) 153
Bloch, Bernard (1907–1965) 295, 303, 307, 308, 309, 311, 313
Bloomfield, Leonard (1887–1949) 5, 59, 204, 222, 225, 228, 235, 238, 241, 269, 295, 296, 297, 298–305, 306–307, 308, 309, 314, 323
Boas, Franz (1859–1942) 223, 225, 295, 296, 297, 298, 299, 300, 304, 305, 400
Boccaccio, Giovanni (1313–1375) 149, 150, 152, 155
Bodmer, Johann Jacob (1698–1782) 423
Boethius (Anicius Manlius Torquatus Severinus, 480–524 A.D.) 126, 127, 137, 138, 141, 142, 183, 420, 421, 422
Boethius of Dacia (fl.1270) 132, 133, 136, 143
Böhm, Roger (20th century) 355
Boniface, Saint (c.680–754 A.D.) 124, 125, 421, 427
Bonnefoy, Yves (b.1923) 429
Booth, Andrew D(onald, b.1918) 433, 445
Booth, Kathleen H(ylda) V(alerie, b.1922)) 448
Bopp, Franz (1791–1867) 4, 5, 179, 181, 191, 196, 197, 198, 203, 213, 214
Borchardt, Rudolf (1877–1945) 429
Borgini, Vincenzio (1515–1580) 154, 155, 156
Boscán, Juan (c.1490–1542) 423
Bouhours, Dominique (1628–1702) 166
Boxhorn(ius), Marcus Zuerius (1602–1653) 189
Bracciolini, Poggio (1380–1459) 148, 153
Braune, Wilhelm (Theodor, 1850–1926) 204, 205, 298
Bréal, Michel (Jules Alfred, 1832–1915) 223, 225, 234, 240
Breitinger, Johann Jacob (1701–1776) 423
Brend, Ruth M(argaret, b.1925?) 315
Bresnan, Joan W. (b.1945) 339
Brewster, (*Sir*) David (1781–1868) 417
Brito, Radulphus, *see* Radulphus Brito
Brosses, Charles de, *see* De Brosses, Charles 188, 189, 392
Brown, Anthony F(razer) R(itchie, 20th cent.) 434, 446
Brucidi, Antonio (c.1495–1566) 422
Brücke, Ernst (Wilhelm, *Ritter* von, 1824–1880) 381–382, 383, 384, 386, 396, 401, 402, 403, 404, 406, 414
Bruni (Aretino), Leonardo (1369–1444) 52, 155, 156, 422
Brunot, Ferdinand (Eugène, 1860–1938) 174
Buber, Martin (1878–1965) 428
Budé, Guillaume (*alias* Budaeus, 1467–1540) 161
Bühler, Karl (Ludwig, 1879–1963) 252, 280, 290
Bullokar, William (c.1531–1609) 391
Bunsen, Christian Karl Josias, *Freiherr* von (1791–1860) 394
Burckhardt, Jacob (1818–1897) 10
Bureus, Johannes (1568–1652) 181
Buridan, Jean (*or* John, c.1300–1359) 140, 141
Burnouf, Émile (1821–1907) 425
Bursill-Hall, Geoffrey L(eslie, b.1920) 130
Busse, Winfried (b.1942) 281
Busto, Bernabé de (d.1557) 158
Butler, Charles (1560–1647) 374, 391
Butler, Christopher S. (b.1945) 274, 275
Butt, David (b.1950) 274, 275
Butterfield, (*Sir*) Henry (1900–1979) 6, 10

C

Caesar, Gaius Julius (100–44 B.C.) 106
Calepino, Ambrogio (c.1435–1511) 148
Calvin, Jean (1509–1564) 422
Camden,William (1551–1623) 183
Campbell, George (1719–1796) 424
Caṅkaranamaccivāyar (18th cent. A.D.) 78
Caper, Flavius (late 2nd cent. A.D.) 108
Capmany Suris y Montpalau, Antonio (1742–1813) 423
Caramuel y Lobkowitz, Juan de (1606–1682) 159
Carbonell, Jaime G(uillermo, b.1953) 440, 450

Carlino, Marco Antonio Ateneo (fl.1533) 155
Carlyle, Thomas (1795–1881) 425
Cassiodoro de Reina, *see* de Reina, Cassiodoro
Cassiodorus (Flavius Magnus Aurelius Cassiodorus, *Senator*, c.490–583 A.D.) 127, 420
Castelvetro, Luodovico (c.1505–1571) 152, 153, 155, 156
Cauchie, Antoine (c.1530–c.1601) 161
Caxton, William (1422–1491) 421
Ceccato, Silvio (2nd half of 20th cent.) 435
Čelakovský, František (Ladislav, 1799–1852) 198
Chajjug, Judah, *see* Ḥayyūj, Yehuda b. David
Challoner, Richard (*bishop*, 1691–1781) 424
Chaloupka, Bedřich (2nd half of 20th cent.) 448
Chamberlain, Basil Hall (1850–1935) 49, 50
Champollion, Jean-François (1790–1832) 401
Chandioux, John (2nd half of 20th cent.) 436
Chao, Yuen Ren (1892–1982) 44, 307, 312
Chapin, Paul G(ipson, b.1938) 359
Chapman, George (1559–1634) 423
Chares (late 2nd or early 1st cent. B.C.) 93, 102
Charisius, Flavius Sosipater (late 4th cent. A.D.) 88, 99, 116, 117, 123
Charlemagne (c.722-814 A.D.) 121, 126
Charles V, *Emperor* (1500–1558) 421
Chartier, Roger (b.1945) 11
Chateaubriand, (François) René, *Vicomte* de (1768–1848) 425, 426
Chatton, Walter (1285–1344) 141
Chen Di (1540–1620) 44
Chézy, Antoine Léonard de (1773–1832) 190
Chladni, Ernst Florens Friedrich (1756–1837) 380, 383
Choeroboscus, George (750?–825 A.D.) 113
Chomsky, (Avram) Noam (b.1928)3, 5, 11–12, 13, 169, 173, 175–176, 215, 226, 228–229, 230, 231, 232, 235, 237, 238, 300, 304, 305, 325, 326–342, 343, 345, 346, 353, 356, 434, 447
Christophersen, Paul (b.1910) 277
Chrysippus of Soli ('the Stoic', c.280–207 B.C.) 95, 97, 99
Cicero, Marcus Tullius (106–43 B.C.) 26, 124, 136, 157, 159, 163, 195, 419, 420
Citolini, Alessandro (c.1500–c.1583) 153
Civañāṉa Muṉivar (c. 1725–1785) 77, 78
Cledonius (mid-5th cent. A.D.) 88, 117, 125
Cleland, John (1709–1789) 188
Cleochares (c.300 B.C.) 92
Clerke, Bartholomew (1537–1590) 423
Colebrooke, Henry Thomas (1765–1837) 191
Coles, (James) Oakley (1845–1906) 404
Collinge, N(eville) E(dgar) ("Oscar", b.1921) 195, 203
Collingwood, Robin George (1889–1943) 8
Colmerauer, Alain (2nd half of 20th cent.) 448
Comrie, Bernard (b.1947) 231
Comte, (Isidore) Auguste (Marie Xavier, 1798–1857) 223, 235
Condillac, Étienne Bonnot de Mably de (1714–1780) 14, 174, 184–185, 186
Confucius (Kongzi, 551–479 B.C.) 41
Conington, John (1825–1869) 425
Consentius (late 4th–early 5th cent. A.D.) 88, 116, 123
Cook, Walter A(nthony, b.1922) 355, 359, 363
Copineau, *Abbé* (fl.1750–1780) 187
Cornarius, Janus (1500–1588) 422
Correas, Gonzalo (1571–1631) 159, 160, 161
Corso, Rinaldo (1525–c.1580) 155
Court de Gébelin, Antoine (1725–1784) 196
Covarrubias Orozco, Sebastián de (1539–1613) 158, 160–161
Crampon, *abbé* Augustin (1826–1894) 426
Cranmer, Thomas (*Archbishop* of Canterbury, 1489–1566) 422
Crates of Mallos (fl. mid-2nd cent. B.C.) 86, 93, 103, 107
Crathorn, William (*or* John, fl.1330) 142
Croce, Benedetto (1866–1953) 6, 8, 227, 244, 245
Culioli, Antoine (b.1924) 430
Cullingford, Richard E. (b.1946) 450
Culpeper, Nicholas (1616–1654) 424
Curry, H. B. (b.1920?) 349, 351
Cuvāmināta Tēcikar (early 17th cent. A.D.) 78
Czermak (Čermák), Jan Nepomuk (1828–1873) 378, 384

D
Dahl, Östen (b.1945) 362
Daines, Simon (17th cent.) 374
Dante Alighieri (1265–1321) 149, 150, 152, 155, 373, 426
Darbelnet, Jean (1907?–1992?) 430
Darwin, Charles (Robert, 1809–1882) 14, 200, 397, 404, 417
Darwin, Erasmus (1731–1802) 397, 404, 417
De Laet, Jan (1593–1649) 189
de Balmes, Abraham (c.1440–1523) 26
Delbrück, Berthold (Gustav Gottlieb, 1842–1922) 3, 4, 5, 205, 206, 222
Delille, Jacques (1783–1813) 423
Della Luna, Niccolò (1410–*post* 1450) 153
Demetrius, Chlorus (late 2nd or early 1st cent. B.C.) 102
Democritus (460/457–mid-4th cent. B.C.) 92, 93
Derrida, Jacques (b.1930) 9, 229, 234, 239
Des Autels, Guillaume (1529–1581) 163–164
Descartes, René (1596–1650) 170, 175, 176, 424
Desphande, Madhav M. (b.1946) 67, 72, 74
Despauterius, Johannes (Jan van Pauteren, c.1460–1520) 148
Dewey, John (1859–1952) 235
Diderichsen, Paul (1905–1964) 4
Didymus ('Chalkenteros', late 1st cent. B.C.) 106
Dik, Simon Cornelis (1940–1995) 356
Ding Du (990–1053) 42
Diocles Magnes ('of Magnesia', 1st cent. B.C.) 96
Diodati, Giovanni (1576–1649) 422

Diodorus Siculus (fl.44 B.C.) 93
Diogenes Laertius (c.341–270 B.C.) 91, 95, 96, 99, 100
Diogenes the Babylonian (c.240–152 B.C.) 96, 99, 100
Diomedes (fl.370–380 A.D.) 88, 116, 117, 118, 123
Dionysius Thrax (170–90 B.C.) 86, 94, 95, 96, 97, 98, 103, 111, 112, 115, 149, 372
Dodart, Denys (1634–1707) 378
Doddridge, Philip (1739–1786) 424
Dolet, Estienne (c.1509–c.1546) 163
Donatus, Aelius (mid-4th cent. A.D.) 88, 89, 115, 116, 117, 118, 122, 123, 124, 125, 126, 127, 128, 130, 131, 132, 133, 136, 148, 154, 162, 169
Dorn, Gerhard (fl.1570–1590) 422
Dositheus (late 4th cent. A.D.) 88, 116, 123, 127
Dostert, Léon Émile (1904–1971) 433, 434, 445–446
Douglas, Gavin (1472–1522) 423
Dow, Alexander (1735/36–1779) 188, 189, 190
Drăganu, Nicolae (1884–1939) 3
Dreyfus-Graf, Jean (20th cent.) 418
Dryden, John (1631–1700) 423, 425
Du Bellay, Joachim (1522?–1560) 161, 165
Du Bois-Reymond, Felix Heinrich (1782–1865) 383, 385, 396
Duan Yucai (1735–1815) 44
Dubois, Jacques (Sylvius, 1478–1550) 150, 162, 163, 166
Dubost, Jean-Pierre (20th century) 281
Duchesne, Antoine-Nicolas (1747–1827) 198
Duclos, Charles (Pinot *or* Pineau, 1704–1772) 174
Dunash ben Labrat, *see* ben Labrat
Duns Scotus, Johannes (John, 'Doctor subtilis', c.1265–1308) 131, 142, 143, 159
Duran, Profiat (d. c.1414) 26
Duret, Claude (c.1570–1621) 196
Durkheim, Émile (1858–1917) 15, 223, 235

E
Edmont, Edmond (1849–1926) 200, 223
Elstob, Elizabeth (1683–1756) 184
Elstob, William (1673–1715) 184
Emonds, Joseph (b.1940?) 337–338
Emons, Rudolf (b.1945) 281
Emser, Hieronymus (fl.1523) 422
Engel, Ulrich (b.1928) 281, 289
Ennin (794–864 A.D.) 46
Enzinas, Fernando de (d.1523) 142
Epicurus ('of Samos', 341?–270/71 B.C.) 92, 93
Erasmus, Desiderius ('of Rotterdam', 1467–1536) 422, 423
Eutyches (6th cent. A.D.) 123, 128
Evelyn, John (1620–1706) 424

F
Fauchet, Claude (1530–1601) 165
Fawcett, Robin P. (b.1937) 273, 274, 275
Ferrein, Antoine (1693–1769) 378
Festus, Sextus Pompeius (late 1st–early 2nd cent. A.D.) 109
Ficino, Marsilio (1433–1499) 147, 151, 421
Fillmore, Charles J(ohn, b.1929) 229, 254, 315, 330, 331, 352, 353, 354, 355, 358, 359, 360, 361
Finck, Franz Nikolaus (1867–1910) 214, 215
Firth, John Rupert (1890–1960) 226,239,252,268–272, 308, 311, 313, 390, 430
Fischer, Johann Eberhard (1697–1771) 196
Fitzgerald, Edward (1809–1883) 425
Flaccus, Verrius (late 1st cent. B.C.) 108
Flavius Caper, *see* Caper, Flavius
Fodor, Jerry A(lan, b.1935) 344
Fogel, Martin (1634–1675) 196
Foley, William A(uguste, b.1949) 362
Forchhammer, Jörgen (Ebbensen, 1873–1853) 400
Fortunatianus, Atilius (c.4th cent. A.D.) 116, 117
Fortunio, Giovan Francesco (c.1470–1517) 154, 155
Foucault, Michel (Paul, 1926–1984) 10, 11, 229, 239
Fought, John G(uy, b.1938) 295, 299, 313
Fourmont, Étienne (1683–1745) 188
Francis, W(inthrop) Nelson (b.1910) 305
Frank, Othmar (1770–1830) 191
Franklin, Benjamin (1706–1790) 391
Fries, Charles Carpenter (1887–1967) 313
Fries, Peter H. (b.1937) 274
Fromant, *Abbé* (fl.18th cent.) 174
Fudge, Erik C(harles, b.1933) 262, 306
Fujibayashi Fuzan (1781–1836) 49
Fujitani Nariakira (1738–1779) 47, 48, 49, 50
Furfey, Paul Hanly (1896–1992) 230,235

G
Gabelentz, (Hans) Georg (Conon) von der (1840–1893) 197, 214, 215, 223, 254
Gallet, Félix (fl.1800) 198
Garlandus Compotista (d. before 1102) 138
Garnier, Jean (1510–1579) 161
Garvin, Paul L(ucian, 1919–1994) 434,446
Gaza, Theodorus (d. c.1475) 149
Gelenius, Sigismund (1497–1554) 212
Gelli, Giova Battista (1498–1563) 156
Gellius, Aulus (c.135–c.180 A.D.) 96, 108
Ges(s)ner(us), Conrad (von, 1516–1565) 151, 179, 196, 213
Giambullari, Pier Francesco (1495–1555) 153, 154, 155
Gibson, Edmund (1669–1748) 184
Gil(l), Alexander (1565–1635) 374, 390, 391
Gilbert of Poitiers (1085/90–1154) 138, 139
Gilberti, Maturino (15th cent?) 151
Gilliéron, Jules (Louis, 1854–1926) 200, 223, 244
Gleason, Henry Allen, Jr. (b.1917) 305
Gnipho, (Marcus) Antonius (early 1st cent. B.C.) 106
Goddard, (R. H.) Ives (b.1941) 301–302
Goddard, Pliny Earle (1869–1928) 400
Goethe, Johann Wolfgang (von, 1749–1832) 13, 190, 381, 425

Goldsmith, John A. (b.1951) 230
Goropius Becanus, Johannes (van Gorp van Hilvarenbeek, Jan, 1518–1572) 151, 196
Gottsched, Johann Christoph (1700–1766) 423
Gragg, Gene B(alford, b.1938) 19
Grandgent, Charles H(all, 1862–1939) 404
Gray, Elisha (1835–1901) 418
Gray, Louis Herbert (1875–1955) 5
Greenberg, Joseph H(arold, b.1915) 204, 206, 215, 216, 227, 231, 237
Grégoire, Antoine (1871–1955) 411
Gregor(ius) of Rimini (Gregor Ariminensis, c.1300–1358) 141
Gregory, Michael (b.1935) 274
Grice, H(erbert) P(aul, 1913–1988) 70, 114, 344
Grimarest, Jean Leonor de Gallois (1659–1713) 174
Grimm, Jacob (Ludwig Karl, 1785–1863) 4, 181, 187, 191, 203–204, 206, 223, 381, 402
Groot, August Willem de (1892–1963) 280
Grootaers, Willem A. (b.1911) 51
Grotius, Hugo (1583–1645) 189, 424
Gruber, Jeffrey S. (b. 1935?)344, 359
Grugnoli, Giuliano (2nd half of 20th cent.) 448
Grützner, Paul (1847–1919) 404
Gu Yanwu (1613–1682) 44
Guichard, Estienne (fl.1618) 161, 165
Gumperz, John J(oseph, b.1922) 231
Gyarmathi, Sámuel (1751–1830) 196, 203

H

ha-Nagid, Samuel (*alias* Ismail ibn Nagrel'a, 993–1055/56) 22, 23, 24, 25
Haeckel, Ernst (Heinrich Philipp August, 1834–1919) 200
Hajičová, Eva (b.1935) 253
Haldeman, Samuel (1812–1880) 394
Halhead, Nathaniel Brassey (1751–1830) 188, 189, 190, 197
Ḥalîl (d. 9th cent. A.D.?) *see* al-Khalīl,Ibn Ahmad
Hall, Robert A(nderson) Jr. (b.1911) 246
Halle, Morris (b.1923) 208, 228, 230
Halliday, M. A. K. (b.1925) 226, 231, 271, 272, 273, 274, 275, 282, 361, 430
Hamilton, Alexander (1762–1824) 190, 191
Hanxleden, Johann Ernst (1681–1732) 188, 190
Harlow, Stephen J. (b.1943) 326
Harris, James (1709–1780) 174
Harris, Randy Allen (b.1956) 346
Harris, Zellig Sabbettai (1909–1992) 228, 238, 295, 297, 298, 300, 303, 304, 305, 309, 310–311, 313, 326–327, 328
Hart, John (c.1501–1574) 373, 390
Harūn ibn al-Faraj, Abū (*alias* Aaron b. Jeshua, first half of 11th cent. A.D.) 23
Hasan, Ruqaiya (b.1931) 274
Hastings, Warren (1732–1818) 189
Haudricourt, André (b.1910) 209
Hawkins, John A(lan, "Jack", b.1947) 231
Ḥay ben Sherira (939–1038) 23
Hays, David G(lenn, 1928–1995) 434
Ḥayyūj, Judah (c.945–c.1000 A.D.) 22, 24, 25, 26, 27
Heath, Daniel (b.1960?) 289
Hegius, Alexander (d.1498) 148
Helbig, Gerhard (b.1929) 4, 281, 283
Helmholtz, Hermann (Ludwig Ferdinand) von (1821–1894) 381, 383, 386, 414, 417, 418
Henry, Victor (1850–1907) 223
Herbst, Thomas (b.1953) 281, 283, 289
Herder, Johann Gottfried (von, 1744–1803) 14, 186–187, 190, 425
Heringer, Hans-Jürgen (b.1939) 281, 283
Hermann, Ludimar (1838–1914) 378, 381, 414
Herodian (c.170–240 A.D.) 87, 101, 102, 111–115
Herodotus (c.485–425 B.C.) 85, 90, 91, 93, 94, 99, 195, 203
Hervaes Natalis (1250/60–1323) 142
Hervás (y Panduro), Lorenzo (1735–1809) 188, 190, 196
Hervey, Sándor (Geza Joseph b.1942) 290
Hesse, Mary B. (b.1924) 11
Hewson, John (b.1930) 277
Hickes, George (1642–1715) 183, 203
Hill, Archibald A(nderson, 1902–1992) 303, 305
Hirata Atsutane (1776–1843) 48
Hjelmslev, Louis (Trolle, 1899–1965) 226, 227, 228, 237, 238, 240, 241, 254, 262–263, 264, 265, 266, 268, 271, 290, 310, 312, 320, 362
Hoby, Thomas (1524–1585) 423
Hockett, Charles F(rancis, b.1916) 92, 228, 237, 297, 298, 299, 302, 303, 305, 309–310, 311, 312
Hodges, Richard (fl.1634–1649) 374
Hogg, William (17th cent.) 423
Holder, William (1616–1698) 176, 375, 376–377, 378
Hölderlin, Friedrich (1770–1843) 425
Holkot, Robert (c.1290–1349) 141
Hopper, Paul J(ohn, b.1939) 201
Horace (Quintus Horatius Flaccus, 65–8 B.C.) 108, 164, 420
Hörnle, Rudolf (1841–1918) 206
Hotman, François (1524–1590) 165
Houbigant, Charles (1686–1783) 424
Householder, Fred W. (1913–1995) 90, 93, 99, 111, 313
Hovdhaugen, Even (b.1941) 115
Hovelacque, Abel (1843–1896) 223
Howard, Henry, *Earl* of Surrey (1517–1547) 423
Hsü Shen (c.58–147 A.D.) 41–42
Huang, Xiaming (2nd half of 20th cent.) 451
Hübschmann, (Johann) Heinrich (1848–1908) 205
Huddleston, Rodney D. (b.1937) 274, 360, 362
Hudson, Richard A(nthony, b.1939) 274, 289
Huet, Pierre-Daniel (1630–1721) 423
Humboldt, (Friedrich) Wilhelm (Christian Karl Ferdinand), *Freiherr* von (1767–1835) 3, 13, 14, 48, 197, 203, 213, 214, 215, 222, 233, 244, 425
Hutchins, W. John (b.1939) 431

Hyde, Thomas (1636–1703) 183
Hymes, Dell H(athaway, b.1927) 231, 295, 299, 313

I

Ibn al-Sarrāğ, Abū Bakr Muḥammad Ibn as-Sarī (d.310/922 A.D.) 27, 31
Ibn Barun, Isaac (c.1100 A.D.) 25, 27
Ibn Duraid (d.933 A.D.) 36
Ibn Ezra, Abraham (c.1889–1164) 25
Ibn Giḳaṭilla, Moshe b. Samuel (2nd half 11th cent. A.D.) 25
Ibn Ğinnī, Abū ăl'Fatḥ ᶜUtmān (d.392/1002) 27, 28, 30, 31, 33, 34
Ibn-Hazm (994–c.1050) 27, 35
Ibn Janāh, (*Rabbi*) Yonah (*alias* Abū al-Walīd Marwān, c.990–1050) 23, 24, 25, 26, 27
Ibn Jinnī, *see* Ibn Ğinnī
Ibn Kaspi, Joseph (1279–1340) 26
Ibn Maḍā'al Qrṭubī (1120–1196) 31, 34, 35
Ibn Mālik, Muhammad (1203–1274) 29
Ibn Marūth Sikhem, Abū Ishāq Ibrahīm b. Faraj (first half of 12th cent. A.D.) 25
Ibn Nagrel'a, Ismail, *see* ha-Nagid, Samuel
Ibn Parḥon, Samuel (12th cent. A.D.) 25
Ibn Quraysh, Yehuda (2nd half of 10th cent. A.D.) 27
Ibn Tamim, Dunash (c.890–*post* 955/56 A.D.) 27
Ibn Tibbon, Judah (c.1120–c.1190) 25
Ihre, Johan (1707–1780) 181, 203
Imbs, Paul (1908–1987) 277, 279
Isabelle, Pierre (2nd half of 20th cent.) 451
Isidore of Seville (Isidorus Hispalensis, *bishop*, c.570–636) 121, 123, 124, 126, 127

J

Jackendoff, Ray S(aul, b.1945) 336–337, 343, 359
Jäger, Andreas (c.1660–1730) 180, 181, 189, 196
Jakobson, Roman O(sipovič, 1896–1982) 15, 209, 215–216, 225–226, 227, 228, 230, 236, 237, 238, 239, 241, 247–253, 254, 260, 263
Jankowsky, Kurt R(obert, b.1928) 4, 179
Jebb, *Sir* Richard (1841–1905) 425
Jellinek, Max Hermann (1868–1938) 3
Jerusalem, Karl Wilhelm (1746–1772) 187
Jespersen, (Jens) Otto (Harry, 1860–1943) 224, 278, 279, 284, 345, 387, 397, 398, 400, 406, 407, 408, 412
Johannes Scottus (c.810–877) 127, 129
John of Garland (12th cent. A.D.) 130, 164
Joly, André (b.1933) 278, 279
Jones, Daniel (1881–1967) 236, 247, 268, 308, 397
Jones, Linda K. (b.194?) 314
Jones, *Sir* William (1746–1794) 179, 189–190, 196–197, 198, 213, 392, 393, 394, 427
Jónsson, Runólfur (*alias* Runolphus Jonas, d.1654) 181, 183
Joos, Martin (George, 1907–1978) 295, 303, 305, 312
Joscelyn, John (1529–1603) 183
Joseph, John E(arl, b.1956) 221, 233
Joubert, Laurent (1529–1583) 164
Julian of Toledo (622?–690 A.D.) 125, 126
Jurjāni (d.1078) 35
Juvenal (c.50/65–c.127 A.D.) 107, 108, 110, 136

K

Kaiser, Stefan (b.1946) 45
Kant, Immanuel (1724–1804) 14
Karcevskij, Sergej (1884–1955) 224, 225, 239, 241, 253
Katz, Jerrold J(acob, b.1932) 331, 333, 345, 354
Keichu (1640–1701) 47
Kelly, Louis G(erard, b.1935) 136, 419
Kemp, J(abez) Alan (b.1927) 371, 388
Kempelen, Wolfgang von (1734–1804) 380, 381, 402, 403, 417
Kibbee, Douglas A. (b.1949) 161
Kimḥi, David ('Radak', c.1160–c.1235) 25, 26
Kimḥi, Joseph b. Isaak (c.1105–c.1170) 23, 25
Kimḥi, Moshe (d. c.1190) 25
King, Gilbert W. (2nd half of 20th cent.) 433–434
King, Robert D(esmond, b.1934) 208
Kingsley, Norman William (1829–1913) 404
Kiparsky, Paul (b.1941) 59, 208
Kittredge, Richard (b.1941) 448
Klopstock, Friedrich (1724–1803) 425
Koerner, E(rnst) F(rideryk) Konrad (b.1939) 3, 7, 212, 240
Kong Guangsen (1752–1786) 44
Korhonen, Jarmo (Atero, b.1946) 281
Kratzenstein, Christian Gottlieb (1723–1795) 379–380, 381, 417
Kraus, Christian Jacob (1753–1807) 180
Kristeller, Paul O(skar, b.1905) 9
Kroeber, Alfred L(ouis, 1876–1960) 400
Kruszewski, Mikołaj (Habdank, 1851–1887) 236, 238
Kuhn, Thomas S(amuel, b.1922) 4, 7, 8, 11, 12, 297, 345
Kulagina, Olga S. (b.1932) 435
Kuryłowicz, Jerzy (Roman, 1895–1978) 207, 227, 254, 348
Kvastad, Nils Bjørn (b.1938) 9

L

Labov, William (b.1927) 209, 230–231, 235, 275
Lacan, Jacques (1901–1979) 239
LaCapra, Dominik (b.1939) 9, 10
Lacerda, Armando de (1902–19??) 414
Laet, Jan de, *see* De Laet, Jan 197
Lakatos, Imre (*alias* Lipschitz, 1922–1974) 11, 347
Lakoff, George (b.1941) 176, 229, 333–334, 335, 343, 344, 345–347
Lamarck, Jean-Baptiste (Pierre Antoine de Monet), *Chevalier* de (1744–1829) 198, 199
Lamb, Sydney M(acDonald, b.1929) 228, 275, 325, 435, 447
Lambert of Auxerre (fl.1250) 131, 138
Lamy, Bernard (1745–1715) 174

Lancelot, Claude (c.1616–1695) 159, 169, 170, 171, 173, 175
Landsbergen, Jan (2nd half of 20th cent.) 439
Langacker, Ronald W(ayne, b.1942) 364
Langlès, Louis Matthieu (1763–1824) 190
Lascaris, Constantine (1433–1501) 149, 421
Laudan, Larry (b.1941) 344
Lavoisier, Antoine Laurent de (1740–1796) 199
Le Brigant, Jacques (1720–1804) 189
Le Brun, Philippe (pseud. Glaumalis de Vezelet, 16th cent.) 164
Leconte de Lisle, Charles Marie (1818–1894) 426
Leech, Geoffrey (b.1936) 323
Leeser, *rabbi* Isaac (1806–1868) 426
Lefèvre d'Étaples, Jacques (1455–1537) 422
Lehmann, Winfred P(hilipp, b.1916) 434–435, 449
Lejeune, Michel (b.1907) 277
Lemaistre de Saci, Isaac-Louis (1613–1684) 424
Lemke, Jay L. (b.1950?) 274
Lenz, Rudolf (*alias* Rodolfo, 1863–1935) 404
León, *Fray* Luis de (1527–1591) 423
Léon, Marjorie (Roth, b.1952) 437, 448, 450
Leroy, Maurice (1909–1991) 4
Lersch, (Johann Heinrich) Laurenz (1811–1849) 3
Lessing, Gotthold Ephraim (1729–1781) 185, 187
Leto, Giulio Pomponio (1428–1498) 148
Levi, Judith N(aomi, b.1944) 346
Lévi, Sylvain (1863–1935) 206
Lévi-Strauss, Claude (b.1908) 239
Levita, Elijah (*alias* Eliyahu Baḥur, 1469–1549) 26
Lewis, William (1714–1781) 424
Liburnio, Niccolò (c.1474–1557) 155
Linacre, Thomas (1465–1524) 149, 155, 169, 422, 424
Lingard John (1771–1851) 426
Livius Andronicus (fl.272–250 B.C.) 103, 420, 421
Ljukanov, Ariadne (20th cent.) 434, 446
Lloyd, Richard J(ohn, 1846–1906) 406, 414
Locke, John (1632–1704) 138, 184, 225, 425
Locke, William Nash (1909–c.1980) 446
Lockwood, David G. (b.1940) 320, 322
Lod(o)wick, Francis (1619–1694) 176, 392
Longacre, Robert E(dmondson, b.1922) 315, 318, 355, 359
Lounsbury, Floyd G(len, b.1914) 297
Lovejoy, Arhur O(ncken, 1873–1962) 9
Lu Fa-yen (fl.600 A.D.) 43
Lucian(us, 'of Samosata', c.125–c.192 A.D.) 163, 417
Lucretius (Titus Lucretius Clarus, c.99–55 B.C.) 106, 136, 195
Ludolf, Hiob (1624–1704) 180, 197
Luhtala, Anneli (b.1956) 121
Luna, Fabricio (d.1559) 155
Lundell, Johan August (1851–1940) 398, 400, 4062
Luther, Martin (1483–1546) 422, 424
Lyell, (Sir) Charles (1797–1875) 11, 199, 205
Lyons, (*Sir*) John (b.1932) 354
Lytinen, Steven L. (2nd half of 20th cent.) 450
Lytle, Eldon G(rey, b.1936) 449, 450

M
MacKenzie, Colin (1753?–1829) 191
Macklovitch, Elliott (2nd half of 20th cent.) 451
MacKnight, James (1721–1800) 424
MacMahon, Michael K(enneth) C(owan, b.1943) 183, 398
Macrobius, (Ambrosius) Theodosius (late 4th–early 5th cent. A.D.) 88, 116
Madvig, Johann Nikolai (1804–1886) 197
Maffei, Raffaele (1455–1522) 153
Magendie, François (1783–1855) 398
Mair, John (1467/69–1550) 137
Malaināṭar (13th cent. A.D.) 78
Malherbe, François de (1555–1628) 166
Malkiel, Yakov (b.1914) 6, 8, 10
Malmberg, Bertil (b.1913) 4, 240
Malthus, Thomas Robert (1766–1834) 425
Mandelbaum, David G(oodman, 1911–1987) 297
Mandeville, Bernard de (1670–1733) 187
Marey, Étienne Jules (1830–1904)408
Marot, Clément (1495?–1544) 163
Marsilius of Inghen (c.1330–1396) 140
Martial (c.40–c.104 A.D.) 107, 148
Martianus Capella (fl.430 A.D.) 89
Martin, James R. (b.1937) 274, 275
Martinet, André (b.1908) 92, 207, 209, 226, 230, 238, 240, 263, 290
Martini, Georg Heinrich (fl.1769–1781) 424
Masterman, Margaret (1910–1986) 435
Matthiessen, Christian (b.1956) 274, 275
McCawley, James D(avid, b.1938) 333, 343, 344, 345, 346, 347
McCord, Michael (2nd half of 20th cent.) 441
McDavid, Raven Ioor, Jr. (1911–1984) 230, 235
Mead, George Herbert (1863–1 931) 235
Meenakshisundaran, T. P. (1901–1980) 79
Meiners, Christoph (1747–1810) 189
Meir b. David (late 13th cent. A.D.) 24
Mel'čuk, Igor A(leksandrovič, b.1932) 435, 436
Melby, Alan K(enneth, b.1948) 449
Ménage, Gilles (1613–1692) 165
Mendelssohn, Moses (1729–1786) 185
Menzerath, Paul (1883–1954) 412, 414
Mercator, Marius (c.400–450 A.D.) 420
Merkel, Carl Ludwig (1812–1876) 382, 383, 384, 386, 396, 403
Methodius, St. (apostle of the Slavs, c.825–885) 421
Meurier, Gabriel (c.1530–1587) 158, 161
Meyer, Ernst Alfred (1873–19??) 405, 408, 409, 412, 414
Michaelis, Christian Benedict (1680–1764) 188
Michaelis, Johann Heinrich (1668–1738) 180
Mikami, Akira (1903–1971) 50
Miller, James E(dward, "Jim", b.1942) 348, 355
Milton, John (1608–1674) 147, 423, 426
Minagawa Kien (1734–1807) 47
Minerbi, Lucilio (c.1490–*post* 1522) 155
Mitchell, Terence F(rederick, b.1919) 270, 271

Moignet, Gerard (1912–1978) 277, 278, 279
Molho, Maurice (1922–1995) 277
Molina, Alonso de (fl.1571) 151
Monboddo, James Burnett, *Lord* (1714–1799) 187, 188, 189, 378
Moncrieff, Scott (19th cent.) 429
Monosini, Angelo (fl.1604) 153–154
Montague, Richard (1932–1971) 348
Montanus, Petrus (*alias* Berch *or* Berg, Pieter, c.1594–1638) 377
Moses ben Isaac, *see* ben Hanesi'ah 25
Motoori Haruniwa (1763–1828) 47, 48
Motoori Norinaga (1730–1801) 45, 47, 48, 49
Mounin, Georges (*alias* Jean Boucher, 1910–1993) 4
Müller, Andreas (1630–1694) 188
Müller, Friedrich (1834–1898) 215
Müller, Johannes (1801–1858) 378
Mullins, Nicholas C. (1939–1988) 11
Munivar, Civañāna, *see* Civañāna Munivar
Münster, Sebastian (1489–1552) 21, 26
Murethach (= Muridac (9th cent. A.D.) 127
Murray, Gilbert (1966–1957) 429
Murray, Stephen O. (b.1950) 11, 12
Musgrave, Alan (20th century) 346
Muzio, Girolamo (1496–1576) 153
Myogaku (1056?–1122?) 46

N
Nagao, Makoto (b.1936) 438, 440
Nathan ben Yeḥiel (1035–c.1110) 25
Nāvalar, Āṟumuka, *see* Āṟumuka Nāvalar
Neale, John Mason (1818–1866) 426
Nebrija, Elio Antonio de (1444?–1522) 148, 150, 151, 157–158, 160, 373
Neckam, Alexander (1157–1217) 164
Newman, Francis William (1805–1897) 425
Newman, Stanley S(tewart, 1905–1984) 298, 304
Newmeyer, Frederick J(aret, b.1940) 5, 327, 335, 345, 346
Nicholas of Paris (fl.1250) 139
Nicole, Pierre (1625–1695) 171, 172, 175
Nicolson, William (1655–1727) 183, 184
Nicot, Jean (*sieur* de Villemain, c.1520–1604) 164, 165
Nida, Eugene A(lbert, b.1914) 305, 427, 430
Nigidius Figulus (d.45 B.C.) 106
Nilson, Don L(ee) F(red, b.1934) 360
Nirenburg, Sergej (b.1952) 440, 450
Nobili, Roberto (de, 1577–1656) 188
North, *Sir* Thomas (1535–1601?) 423
Norton, Thomas (1532–1584) 422
Nowell, Laurence (d.1576) 183

O
Ockham, William, *see* William of Ockham
Oertel, Hanns (1868–1952) 223
Oettinger, Anthony G(ervin, b.1929) 434, 446, 447
Ohala, John J(erome, b.1941) 416
Olivétani, Pierre (d.1538) 422
Oresme, Nicole (1320–1382) 421
Osthoff, Hermann (1847–1909) 6, 205, 206
Ostler, Norman (20th century) 362
Oswald, Victor (Amandus, b.1909) 433
Ota Zensai (1759–1829) 49
O'Toole, Michael (b.1934) 274, 275
Otsuki Fumihiko (1847–1928) 50

P
Pagden, Anthony (b.1945) 9
Palaemon, Quintus Remmius (mid-1st cent. A.D.) 83, 87, 107, 108, 109, 115, 117, 122
Pallas, Peter Simon (1741–1811) 196, 213
Palmer, Frank R(obert, b.1922) 268, 269, 271
Palsgrave, John (1480?–1554) 150, 161
Panconcelli-Calzia, Giulio (1878–1966) 410, 412, 413, 414
Pāṇini (c.500 B.C.) 45, 59–65, 66, 67, 68, 69, 73, 74, 77, 78, 94, 371
Pankowicz, Zbigniew L. (2nd half of 20th cent.) 448–449
Panov, Dmitrij Jur'evič (b. c.1925) 435
Paracelsus (Theophrast Bombast von Hohenheim, 1493–1541) 422, 424
Pasquier, Estiennne (1529–1615) 165
Passmore, John (Arthur, b.1914) 9–10
Passy, Paul (Édouard, 1859–1940) 386, 387, 397, 406
Patañjali (2nd cent. B.C.) 60, 66, 68, 69, 73
Patón, Bartolomé Jiménez (1569–1640) 158
Paul of Venice (Paulus Venetus, c.1369–1429) 141
Paul, Hermann (1846–1921) 4, 5, 6, 50, 204, 205, 206, 223, 246, 414
Paulinus a Sancto Bartholomaeo (*alias* Philipp Wesdin/Vesdin, 1749–1806) 188, 190
Paulus Diaconus (c.800 A.D.) 126, 127
Pavaṇanti (early 13th cent. A.D.) 78
Pedersen, Holger (1867–1953) 3, 4, 5, 196, 206, 222
Pelletier du Mans, Jacques (1517–1582) 163–164
Percival, W(alter) Keith (b.1930) 8, 135, 147, 373
Perion, Joachim (1499?–1559) 161, 165
Perler, Dominik (b.1965) 137
Persio, Ascanio (1554–1610) 153, 154
Peruntēvaṉār (early 12th cent. A.D.) 78
Peter Abelard (1079–1142) 138, 139, 140, 141
Peter Helias (Heliae, fl.1140; d. *post* 1166) 129, 130–131, 136
Peter of Spain (Petrus Hispanus, non-papa, fl.1175) 140
Peter of Spain (Pope John XXI, c.1205–1277) 131, 138
Petrarch (Francesco Petrarca, 1304–1374) 147, 149, 150, 152, 154, 155, 423
Petrus Helias, *see* Peter Helias
Petrus of Pisa (7th cent. A.D.) 126, 127
Philoxenus (early 1st cent. B.C.) 106
Phocas (late 4th–early 5th cent. A.D.) 88, 116, 117, 123, 128
Piaget, Jean (1896–1980) 239, 242

Piccolomini, Silvius (later Pope Pius II, 1433–1499) 422
Pictet, Adolphe (1799–1875) 210
Pike, Kenneth L(ee, b.1912) 228, 236, 301, 304, 305, 309, 310, 311, 312, 313, 314–319, 398
Pillot, Jean (1510–1570) 161
Pitman, (Sir) Isaac (1813–1897) 383, 393, 394, 398
Plato (429–c.347 B.C.) 84, 90, 91, 92, 93, 94, 96, 101, 102, 124, 147, 151, 234, 236, 372, 420, 421
Platt, John T. (d.1990) 355
Plautus (d.184 B.C.) 103, 420
Pliny the Elder (23–79 A.D.) 107, 109, 110, 163
Plotius Sacerdos, Marius (3rd cent. A.D.) 117, 88, 115, 116, 117, 118
Pokoke, Edward (1604–1691) 183
Polivanov, Evgenij Dmitri'evič (1891–1938) 207
Pompeius (late 5th–early 6th cent. A.D.) 89, 116, 117, 125
Pompolio, Paolo (c.1455–1491) 156
Pons, Jean-François, S.J. (1698–1752?) 188, 189, 190, 196
Porphyrios of Tyros, Pomponius ('the Phoenician', c.232–304 A.D.) 108, 137, 420
Portus, Franciscus (Porto, Francesco, 1511–1581) 96
Postal, Paul M(artin, b.1936) 333, 332, 343, 345, 346
Postel, Guillaume (1510–1581) 151, 165
Pott, August Friedrich (1802–1887) 204, 215
Powell, John Wesley (1834–1902) 400
Prieto, Luis Jorge (b.1926) 239, 242
Priscian(us Caesariensis, 'of Cesarea', late 5th–early 6th cent. A.D.) 87, 89, 96, 97, 102, 110, 111, 114, 115–118, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 138, 148, 154, 158, 162, 169
Probus, Marcus Valerius (fl.60 A.D.) 87, 107, 108, 117
Proclus (c.411–485 A.D.) 93
Protagoras (c.485–411 B.C.) 84, 91, 92, 94, 99
Ptolemaios ('Ptolemy the Peripatetic', 2nd cent. B.C.) 102
Pulleyblank, Edwin G(eorge, b.1922) 51, 53
Pullum, Geoffrey K(eith, b.1944) 345
Purkyně, Jan Evangelista (1787–1869) 381

Q
Qimḥi, David, *see* Kimḥi, David
Quintilian(us), Marcus Fabius (c.35–c.95 A.D.) 26, 86, 87, 88, 98, 107, 108, 109, 110, 115, 118, 124, 148, 169, 420

R
Radden, Günter (20th cent.) 359
Radice, Betty (1912–1985) 429
Radulphus Brito (c.1275–1320) 132, 134, 136, 143
Rambaud, Honorat (fl.1580) 164
Ramus, Petrus (*alias* Pierre de La Ramée, 1715–1772) 149, 150, 161, 162, 163, 164, 374
Ranke, Leopold (von, 1795–1886) 10
Rask, Rasmus Kristian (1787–1832) 4, 181, 191, 197, 198, 203, 262, 381
Raumer, Karl Otto von (1805–1859) 3, 4, 5, 6
Régnier-Desmarais, *abbé* François-Séraphin (1632–1713) 174
Reich, Peter A. (b.1944?) 323, 324–325
Reichard, Elias Caspar (1714–1791) 3
Reifler, Erwin (2nd half of 20th cent.) 433, 445
Reina, Cassiodoro de (1520–1599) 422
Remigius of Auxerre (Remigius Autissiodorensis, c.841–908) 128
Remmius Palaemon, Quintus (1st cent. A.D.) *see* Palaemon, Quintus Remmius
Resen(ius), Peder Hansen (1625–1688) 181
Restaut, Pierre (1696–1764) 174
Reuchlin, Johannes (1456–1522) 21, 26, 150, 180
Rhodes, Ida (2nd half of 20th cent.)434, 446
Rhys, John David (*alias* Siôn Dafydd, 1534–1609) 154
Richardson, Brian (b.1946) 152
Richens, Richard Hook (1918–1984) 433
Riedlinger, Albert (1883–1978) 233, 240
Robert Blund (12th cent. A.D.) 129, 131
Robins, Robert H(enry, b.1921) 3, 4, 136, 269
Robinson, Jane J(ohnson, b.1918) 358
Robinson, Robert (17th cent.) 374–375
Rocher, Rosane (b.1937) 188
Rodriguez, João (1561–1634) 49
Roger Bacon ('Doctor mirabilis', c.1214–1292/94) 131, 135, 142, 417, 421, 422
Rondeau, Guy (1930–1987) 448
Ronsard, Pierre de (1524–1588) 161, 165, 423
Rosapelly, Charles (d.1913) 381
Rosenbaum, Peter Stephen (b.1938) 331–332
Rosenzweig, Franz (1886–1929) 428
Ross, John Robert ("Háj", b.1938) 339–340, 343, 345, 346
Rossetti, Dante Gabriel (1828–1882) 426
Roth, Heinrich (1620–1668) 188, 196
Rousseau, Jean-Jacques (1712–1778) 185, 187
Rousselot, (Pierre) Jean (*abbé*, 1846–1924) 387, 408, 409, 410, 411
Rufinus (345–406 A.D.) 420

S
Saadya Gaon (*alias* Saadya ben Joseph al-Fayyumi, 882–942) 21, 22, 23, 24, 26–27
Sacerdos, Marius Plotinus, *see* Plotinus Sacerdos
Sacks, Harvey (1935–1975) 231
Saddock, Jerrold M. (b.1935?) 345
Saint-Cyran, *abbé* (17th cent.) 170
Salmasius, Claudius (Saumaise, Claude, 1588–1653) 196
Salmon, Paul B(ernard, b.1921) 184
Saluti, Colucci (1331–1406) 147
Salviati, Lionardo (1539–1589) 150, 155
Sanctius, Franciscus (*alias* Francisco Sánchez de las Brozas, 1523–1601) 113, 114, 149, 157, 158, 159, 169, 171

Sannazaro, Jacopo (1456?–1530) 155
Santo Tomás, Domingo de (fl.1560) 151
Sapir, Edward (1884–1939) 201, 204, 207, 214, 215, 223, 225, 228, 235, 295, 297–298, 299, 300, 304, 305, 307, 308, 309, 312, 314, 400
Sassetti, Filippo (1540–1588) 154, 188, 196
Saumaise, Claude, *see* Salmasius 189
Saussure, Ferdinand (-Mongin) de (1857–1913) 4, 6, 14, 50, 70, 92, 197, 199, 205, 206, 221–222, 223, 224, 225, 226, 227, 231, 232, 233–242, 254, 261, 262, 264, 271, 272, 277, 308, 312, 320
Sayce, *Rev.* Archibald H(enry, 1845–1933) 223
Scaliger, Joseph Justus (1540–1609) 151, 196, 212
Scaliger, Julius Caesar (1484–1558) 149, 159, 169, 177
Scaurus (2nd/3rd cent. A.D.) 123, 127
Schank, Roger C(arl, b.1946) 440, 450
Scherer, Josef (1776–1829) 393
Scherer, Wilhelm (1841–1886) 199, 204, 205
Schlegel, (Carl Wilhelm) Friedrich (*Freiherr* von, 1772–1829) 179, 189, 190, 191, 197, 198, 199, 213, 214, 215
Schlegel, August Wilhelm (*Freiherr* von, 1767–1845) 190, 191, 197, 204, 213, 214
Schleicher, August (1821–1868) 4, 5, 11, 14, 180, 197, 198–199, 200, 201, 204, 214–215, 222, 245
Schleiermacher, Friedrich Ernst Daniel (1768–1834) 393, 425
Schopenhauer, Arthur (1788–1860) 190
Schottel(ius), Justus Georg (1612–1676) 180, 198
Schultius, Benjamin (*alias* Schultze, 1689–1760) 188, 189, 196
Schumacher, Helmut (b.1941) 281
Scioppius (Schoppe), Gaspar (*or* Kaspar, 1576–1649) 171
Scott (de Martinville), Édouard Léon (1817–18??) 414
Scott, Bernard E. (2nd half of 20th cent.) 437, 448
Scripture, Edward Wheeler (1864–1945) 408, 412, 414
Sebeok, Thomas A(lbert, b.1920) 3, 236
Sedulius Scottus (9th cent. A.D.) 127, 128
Segond, Louis (1810–1885) 426
Selden, John (1584–1654) 183
Seneca, Lucius (or Marcus) Annaeus ('the Elder', c.55 B.C.–40 A.D.) 107, 110
Seneca, Lucius Annaeus ('the Younger', c.5 B.C.–65 A.D.) 420
Servius (Maurus Servius Honoratus, fl. c.400 A.D.) 88, 116, 125, 126
Sethu Pillai, R. P. (1886–1961) 78, 79
Sextus Empiricus (fl. c.180–200 A.D.) 88, 91, 93, 96, 99, 100, 101, 102
Shaumyan (Šaumjan), Sebastian K(onstantinovič, b.1916) 348–351
Shen Yue (late 5th cent. A.D.) 44, 52
Sherburne, *Sir* Edward (1616–1702) 423
Sheridan, Thomas (1719–1788) 378, 391
Sieg, Emil (1866–1951) 206
Siegling, Wilhelm (1880–1946) 206
Sievers, Eduard (1850–1932) 204, 205, 382, 383, 384, 385, 386, 387, 398, 404, 406, 407
Siger de Brabant (c.1240–1284) 143
Siger de Courtrai (d.1341) 132, 133, 134, 143
Simon of Faversham (c.1250–1306) 143
Simon, Richard (1638–1712) 424
Simpson, J. M. Y. (b.1932) 247
Sinclair, John McH(ardy, b.1933) 271, 275
Sinner, Jean Rodolphe de (1730–1787) 188, 189
Sisenna (1st cent. B.C.) 106
Skalička, Vladimír (1909–1991) 216, 253
Skinner, Burrus Frederick (1904–1990) 228
Slocum, Jonathan (b.1946) 449
Smaragdus (9th cent. A.D.) 126
Smart, John M. (2nd half of 20th cent.) 450
Smirnov-Trojanskij, Petr Petrovič (1894–1950) 433
Smith, Adam (1723–1790) 187, 213, 425
Smith, Henry Lee, Jr. ("Haxie", 1913–1972) 295, 303, 305
Smith, *Sir* Thomas (1513–1577) 373, 390, 391
Smolett, Tobias (1721–1771) 423
Socrates (469–399 B.C.) 84, 90, 91, 92, 102
Somers, Harry L. (20th century) 358, 362, 363
Sommerfelt, Alf (Axelssøn, 1892–1965) 235
Somner, William (1598–1669) 183
Soto, Domingo de (1494–1560) 142
Sotomayor, Baltazar (fl.1565) 158
Spelman, *Sir* Henry (1564–1641) 183
Speroni, Sperone (1500–1588) 156
Staal, Frits (*alias* Johan Frederik, b.1930) 66
Stachowitz, Rolf A. (b.1934) 449
Starosta, Stanley (b.1939) 354, 356, 359, 362
Steiner, Erich (d.1954) 274, 275
Steinthal, H(eymann = Chajim, 1823–1899) 3, 197, 213, 214, 215, 222, 233
Stephanius, Stephanus Johannis (1599–1650) 180
Stephens (*or* Stevens), Thomas (1549?–1619) 188
Stewart, Dugald (1753–1828) 189
Stiernhielm, Georg (1598–1672) 196
Stilo, Lucius Aelius (c.154–c.74 B.C.) 86, 103
Stockwell, Robert P(aul, b.1925) 355, 359
Storm, Johan F. B. (1836–1920) 384, 385, 386, 387, 398, 406
Strahlenberg, Philipp Johann von (1676–1747) 181
Stumpf, Carl (1848–1936) 414
Subbiondo, Joseph L(eonard, b.1940) 174
Suetonius (c.69–*post* 122 A.D.) 107
Suleiman, M.Y[asir] I. H. (b.1951) 28
Sullivan, Harry Stack (1892– 1949) 297
Sullivan, William J(oseph, b.1942?) 322
Sulpizio, Giovanni (15th cent.) 148
Süssmilch, Peter (*pastor*, 1707–1767) 185–186, 187
Suzuki Akira (1764–1837) 47, 48, 49, 50
Svartvik, Jan (b.1931) 275
Swadesh, Morris (1909–1967) 307, 308, 312, 314
Sweet, Henry (1845–1912) 50, 222, 223, 376, 384–386, 387, 397, 398, 400, 404, 406
Sylvius, *see* Dubois, Jacques

Syr, Peder (1631–1702) 181

T

Tagliavini, Carlo (1903–1982) 4
Tam, Jacob b. Meir (c.1100–1171) 23
Tannen, Deborah (b.1945) 232
Tarbell, Frank Bigelow (1853–1920) 206, 207
Tarde, (Jean) Gabriel (de, 1843–1904) 209, 235
Tarvainen, Kalevi (20th century) 358, 359
Tatiščev, Vasilij Nikitič (1686–1750) 196
Taube, Mortimer (1910–1965) 447
Taverner, Richard (1505–1575) 422
Taylor, Bayard (1825–1878) 425
Taylor, Daniel J(ennings, b.1941) 83, 103, 107
Techmer, Friedrich (Heinrich Herrmann, 1843–1891) 386, 397, 406, 407
Tēcikar, Cuvāminãta, *see* Cuvāminãta Tēcikar
Tēcikar, Vaittiyanāta, *see* Vaittiyanāta Tēcikar
ten Kate (Hermansz.), Lambert (1674–1731) 181, 203, 397
Téné, David (b.1930?) 21
Terence (= Publius Terentius Afer, c.190–159 B.C.) 136, 420
Terentianus Maurus (late 2nd cent. A.D.) 108
Terentianus Scaurus (early 2nd cent. A.D.) 108
Tesnière, Lucien (Valérius, 1893–1954) 228, 253, 254, 257, 279, 280–289, 358, 361
Tetens, Johann Nikolaus (1737–1807) 187
Thámara Bachiller (fl.1550) 158
Thausing, Moritz (1838–1884) 381, 382–383, 396
Thiedemann, Dietrich (1748–1803) 187
Thierry, Guichard (fl.1610) 165
Thomason, Richmond H(unt, b.1939) 348
Thompson, Sandra A. (b.1941) 201, 275
Thornton, William (1759–1828) 391, 392
Thrax, Dionysius (c.100 B.C.) see Dionysius Thrax
Threadgold, Terry (b.1943) 274, 275
Thurot, (Jean) François (Joseph, 1768–1832) 3
Tillmann, Hans Günter (b.1936) 401
Titchener, Edward Bradford (1867–1927) 239
Tocqueville, Alexis de (1805–1859) 10
Togeby, Knud (1918–1974) 263, 265, 266, 268
Tōjō Gimon (1786–1843) 48
Tokieda, Motoki (1900–1967) 48, 50
Tolkāppiya(ṉā)r (1st cent. B.C.?) 78
Tolomei, Claudio (1492–1556) 153, 154, 155, 156
Toma, Pet(e)r (Paul, b.1924) 434, 437, 446, 448
Tomita, Masaru (2nd half of 20th cent.) 450
Tory, Geoffrey (1480?–1533) 161, 163
Trabalza, Ciro (1871–1936) 3
Trager, George L(eonard, 1906–1992) 295, 303, 305, 311
Tresdiskovskij, Vassilij (1703–1779) 423
Trevelyan, (*Sir*) Walter (1797–1879) 393
Trissino, Gi(ov)an Giorgio (1478–1550) 150, 153, 154, 373
Trubetzkoy, Nikolai S(ergeevič, *Prince*, 1890–1938) 13, 207, 225–226, 236, 238, 240, 241, 247–253, 255, 308, 309, 310
Trýphon (late 1st cent. B.C.) 106
Tsurumine Shigenobu (1786–1859) 49
Tucker, Allen B(rown), Jr. (b.1942) 448, 450
Turing, Alan Mathison (1912–1954) 445
Twaddell, William Freeman (1906–1982) 307–308, 312

U

Ueda, Kazutoshi (1867–1937) 49, 51
Uldall, H(ans) J(ørgen, 1907–1957) 262–263, 264
Ulfila (*or* Wulfila, 4th cent. A.D.) 420
Ursus of Beneventum (9th cent. A.D.) 128

V

Vachek, Josef (b.1909) 255
Vaittiyanāta Tēcikar (17th cent. A.D.) 78
Vaiyāpuri Piḷḷai, S. (1891–1956) 78
Valdés, Juan de (c.1495–1541) 157, 160
Valeriano, Piero (1499–1588) 153
Van Valin, Robert D. (b.1952) 277, 279, 362
Varadarajan, Munisāmi (1912–1974) 79
Varchi, Benedetto (1503–1565) 153
Varro, Marcus Terentius (116-27 B.C.) 83, 86, 87, 89, 98, 103 107, 108, 110, 115, 117, 122, 124, 149
Vasconcellos, Muriel (b.1933) 437, 446, 448, 450
Vater, Johann Severin (1772–1826) 196, 197, 212
Vaugelas, Claude Favre (*baron* de Pérouges, *seigneur* de, 1585–1650) 166, 170, 174
Vauquois, Bernard (1929–1985) 436
Velius Longus (early 2nd cent. A.D.) 108
Vendryes, Joseph (Jean Baptiste Marie, 1875–1960) 235
Verrius Flaccus (late 1st cent. B.C.–early 1st cent. A.D.) 109, 110
Veyssière de la Croze, Maturin (1661–1739) 188
Victorinus Maximus (6th cent. A.D.?) 123
Victorinus, (Gaius) Marius (4th cent. A.D.) 88, 116, 117, 127
Viëtor, Wilhelm (1850–1918) 385, 387, 404, 405, 406
Villalón, Cristóbál (c.1510–1562) 158
Villedieu, Alexandre, *see* Alexandre de Villedieux
Villena, Enrique de (1384–1434) 159
Vinay, Jean-Paul (b.1910) 430
Voegelin, Charles Frederick ("Carl", 1906–1986) 5, 308
Volney, Constantin François (Chasseboeuf), *comte* de (Boisgirais, 1757–1820) 391, 392–393
Vossius, Gerardus Joannes (*alias* Gerhard Jan Vos, 1577–1649) 171, 177
Vossius, Isaak (1618–1689) 181

W

Wackernagel, Jacob (1853–1938) 201
Waddington, Charles? Henry? (1905–1975) 239
Wagner, Philipp (fl.1888–1914) 408
Walahfrid Strabo (9th cent. A.D.)128
Wall, Charles William (1783?–1862)189
Wallis, John (1616–1703) 176, 375–376, 377, 404

Walther, Christian Theodor (1699–1741) 189
Wang, Li (1900–1986) 44
Wang, Niansun (1744–1832) 44
Wang, William S(hao)-Y(ung, b.1933) 41, 208
Wanley, Humfrey (1672–1726) 183
Weaver, Warren (1894–1978) 429, 433, 445
Webster, Noah (1758–1843) 426
Wechel, Chrétien (d.1554) 163
Weitkus, Karl L (fl.1931) 412
Wells, Rulon S(eymour III, b.1919) 246, 300, 303, 304
Welte, Werner (b.1948) 352
Wendeler, Paul (1860–19??) 414
Wenker, Georg (1852–1911) 51, 200, 223
Wheatstone, (*Sir*) Charles (1802–1875) 380, 381, 417
Wheeler, Garon (b.1954) 169
Wheelocke, Abraham (1593–1653) 183
Whewell, William (1794–1866) 199
White, Hayden C. (b.1928) 10
Whitney, William Dwight (1827–1894) 15, 197, 199, 200, 205, 208, 214–215, 223, 224, 233, 236
Whorf, Benjamin Lee (1897–1941) 225, 305
Wilamowitz-Moellendorf, (Emmo Friedrich Wichard) Ulrich von (1848–1931) 429
Wilkins, Charles (1749–1836) 190, 191
Wilkins, John (1614–1672) 174–175, 176, 178, 377–378, 380, 391, 392, 417
Wilkins, Wendy (20th century) 359
Wilks, Yorick A. (b.1939) 440, 449, 451
William of Alnvick (fl.1315) 142
William of Conches (c.1080–1153) 129, 130, 131, 138
William of Moerbecke (1215–1286) 421
William of Ockham ('Venerabilis Inceptor', 1285–1347) 138, 140, 141, 142
William of Sherwood (*alias* Shyreswoode, c.1200–c.1270) 131, 138, 139
Willis, Robert (1800–1875) 380, 381, 402, 403, 414, 417
Wilson, Deidre (Susan Moir, b.1941) 345
Wilson, Horace Hayman (1786–1860) 191
Winkworth, Catherine (1821–1877) 426
Witkam, A.P.M. ("Toon", 20th cent.) 439
Wodeham, Adam (c.1298–1358) 141
Wolf, Oskar (fl.1871) 405, 406
Wood, William (2nd half of 20th cent.) 434
Worm, Ole (1588–1654) 180
Wundt, Wilhelm (Max[imilian], 1832–1920) 50, 222, 223, 224, 225, 233, 234, 235, 298, 299, 408

X
Xavier, St. Francis (1506–1552) 427

Y
Yehuda b. David, *see* Ḥayyūj, Judah 23
Yngve, Victor H(use, b.1920) 434, 446, 447
Young, Thomas (1773–1829) 195

Z
Zajjājí (d.948) 27, 31
Zamora, Juan C(lemente, b.1930) 157
Zarechnak, Michael (b.1920) 434, 446
Ziegenbalg, Bartholomäus (1682–1719) 188
Ziegler, Johann Heinrich (17??–17??) 424
Zipf, George Kingsley (1902–1950) 200
Zoëga, Georg (1775–1809) 401
Zvelebil, Kamil V. (2nd half of 20th cent.) 77
Zwaardemaker, Hendrik (1857–1930) 408
Zwirner, Eberhard (1899–1984) 412, 414
Zwirner, Kurt (20th cent.) 412, 414

List of Contributors

Contributors are listed in alphabetical order together with their affiliations. Titles of articles which they have written follow in alphabetical order, along with the respective page numbers. Co-authorship is indicated by *.

ALBRECHT, Jörn (University of Heidelberg, Heidelberg, Germany)
Neolinguistic School in Italy: 243

ALLERTON, David J. (University of Basle, Basle, Switzerland)
Valency Grammar: 280

AMACKER, René (University of Geneva, Geneva, Switzerland)
Geneva School, after Saussure: 239

ANDERSON, John M. (University of Edinburgh, Edinburgh, U.K.)
Case Grammar: 352

ASHER, R. E. (University of Edinburgh, Edinburgh, U.K.)
**Chinese Linguistic Tradition*: 41

BENNETT, David C. (University of London, London, U.K.)
Stratificational Grammar: 320

BENNETT, Winfield Scott (Logos Corporation, Mt. Arlington, New Jersey, U.S.A.)
Machine Translation in North America: 445

BURSILL-HALL, Geoffrey L. (Simon Fraser University, Burnaby, British Columbia, Canada)
Linguistics in the Later Middle Ages: 130

COLLINGE, N. E. (University of Manchester, Manchester, U.K.)
History of Comparative Linguistics: 195; *History of Historical Linguistics*: 203

DESHPANDE, Madhav M. (University of Michigan, Ann Arbor, Michigan, U.S.A.)
Ancient Indian Phonetics: 72

FOUGHT, John G. (University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A.)
American Structuralism: 295

FUDGE, Erik C. (University of Reading, Reading, U.K.)
Post-Bloomfieldian Phonology: 306; *The Glossematic School of Linguistics*: 262

GRAGG, Gene B. (University of Chicago, Chicago, Illinois, U.S.A.)
Babylonian Grammatical Texts: 19

HAJIČOVÁ, Eva (Charles University, Prague, Czech Republic)
Prague School Syntax and Semantics: 253

HALLIDAY, M. A. K. (University of Sydney, Sydney, New South Wales, Australia)
Systemic Theory: 272

HARLOW, Stephen J. (University of York, York, U.K.)
Evolution of Transformational Grammar: 326

HEWSON, John (Memorial University of Newfoundland, St. Johns, Newfoundland, Canada)
Guillaumean Linguistics: 277

†HOUSEHOLDER, Fred W. (Indiana University, Bloomington, Indiana, U.S.A.)
Apollonius Dyscolus and Herodian: 111; *Aristotle and the Stoics on Language*: 93; *Dionysius Thrax, the Technai, and Sextus Empiricus*: 99; *Plato and His Predecessors*: 90

HOVDHAUGEN, Even (University of Oslo, Oslo, Norway)
Roman Ars Grammatica, including Priscian: 115

HUTCHINS, W. John (University of East Anglia, Norwich, U.K.)
Machine Translation: A Brief History: 431

JANKOWSKY, Kurt R. (Georgetown University, Washington, D.C., U.S.A.)
Early Historical and Comparative Studies in Scandinavia, the Low Countries, and German-speaking Lands: 179

JONES, Linda K. (Summer Institute of Linguistics, Jakarta, Indonesia)
Tagmemics: 314

JOSEPH, John E. (University of Hong Kong, Hong Kong)
Saussurean Tradition in Linguistics: 233; *Trends in Twentieth-Century Linguistics: An Overview*: 221

KAISER, Stefan (Tsukuba University, Tsukuba, Japan)
Linguistic Thought in Japan: 45

KELLY, Louis G. (University of Ottawa, Ontario, Canada)
History of Translation: 419

KEMP, J. A. (University of Edinburgh, Edinburgh, U.K.)
History of Phonetic Transcription: 388; *Phonetics: Precursors to Modern Approaches*: 371

KIBBEE, Douglas A. (University of Illinois, Urbana-Champaign, Illinois, U.S.A.)
Renaissance Linguistics in France: 161

KIPARSKY, Paul (Stanford University, Stanford, California)
Pāṇinian Lingusitics: 59

KOERNER, E. F. K. (University of Ottawa, Ontario, Canada)
Historiography of Linguistics: 7; *History of Linguistics: The Field*: 3; *History of Typology and Language Classification*: 212

LANGACKER, Ronald W. (University of California, San Diego, U.S.A.)
Cognitive Grammar: 364

LUHTALA, Anneli (University of Helsinki, Helsinki, Finland)
Early Medieval Grammar: 121

MACMAHON, Michael K. C. (University of Glasgow, Glasgow, U.K.)
Beginnings of Comparative and Historical Studies in Britain: 183

MARTINET, André (Université René Descartes, Paris, France)
Functional Grammar: 290

MCCAWLEY, James D. (University of Chicago, Chicago, Illinois, U.S.A.)
Generative Semantics: 343

MILLER, Jim (University of Edinburgh, Edinburgh, U.K.)
Applicational Grammar: 348

Ohala, John J. (University of California at Berkley, California, U.S.A.)
Speech Technology: Historical Antecedents: 416

Palmer, F.R. (University of Reading, Reading, U.K.)
Firth and the London School of Linguistics: 268

Percival, W. Keith (University of Kansas, Lawrence, Kansas, U.S.A.)
Renaissance Linguistics: An Overview: 147

Perler, Dominik (University of Oxford, Oxford, U.K.)
Medieval Language Philosophy: 137

Pulleyblank, Edwin G. (University of British Columbia, Vancouver, British Columbia, Canada)
History of East Asian Phonetics: 51

Richardson, Brian (University of Leeds, Leeds, U.K.)
Renaissance Linguistics in Italy: 152

Rocher, Rosane (University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A.)
Discovery of Sanskrit by Europeans: 188

Salmon, Paul B. (University of Edinburgh, Edinburgh, U.K.)
Origin of Language Debate in the Eighteenth Century: 184

Simpson, J. M. Y. (University of Glasgow, Glasgow, U.K.)
Prague School Phonology: 247

Staal, Frits (University of California, Berkley, California, U.S.A.)
Indian Theories of Meaning: 66

Subbiondo, Joseph L. (St. Mary's College of California, Moraga, California, U.S.A.)
Universal Language Schemes and Seventeenth-Century Britain: 174

Suleiman, Yasir (University of Edinburgh, Edinburgh, U.K.)
Arabic Linguistic Tradition: 28

Taylor, Daniel J. (Lawrence University, Appleton, Wisconsin, U.S.A.)
Classical Linguistics: An Overview: 83; *Roman Language Science in the Early Empire*: 107; *Varro and Early Latin Language Science*: 103

Téné, David (Hebrew University of Jerusalem, Jerusalem, Israel)
Hebrew Linguistic Tradition: 21

Tillmann, Hans Günter (University of Munich, Munich, Germany)
Early Modern Instrumental Phonetics: 401

Wang, William S.-Y. (University of California, Berkley, California, U.S.A. and the City University of Hong Kong, Hong Kong)
**Chinese Linguistic Tradition*: 41

Wheeler, Garon (Huron College, Huron, South Dakota, U.S.A.)
Port-Royal Tradition of General Grammar: 169

Zamora, Juan C. (University of Massachusetts, Amherst, Massachusetts, U.S.A.)
Renaissance Linguistics in Spain: 157

Zvelebil, Kamil V. (University of Leiden, Leiden, Netherlands)
Tamil Linguistic Tradition: 71

Ollscoil na hÉireann, Gaillimh
3 1111 40044 3378